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MASS RADIOGRAPHY

WITH SPECIAL REFERENCE TO SCREEN PHOTOGRAPHY AND PULMONARY TUBERCULOSIS

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Mass radiography may be carried out in different ways. Many such investigations directed towards the discovery of pulmonary tuberculosis have been conducted in the past on large selected groups of population by ordinary *x*-ray methods. The work of Opie,[57] Hetherington,[35] Rathbone,[61] and Wakefield[56] in the United States is well known in this connexion. Wingfield,[57] and more recently D'Arcy Hart and Morland,[25] have undertaken work on similar lines in this country. Mass use of the full-size *x*-ray film must necessarily have limited application on grounds chiefly of expense, and the fluorescent screen alone has accordingly found favour with many workers, particularly in France. The greatest drawback to screening alone is the absence of any record. In America a method of mass radiography by means of a paper roll casette has been invented, and this has been further elaborated in Germany, chiefly by Heisig[33] and Schmitt-Grandhomme.[77] The paper is relatively inexpensive, and a full-sized record which is nearly equivalent in detail to a celluloid film is obtained. The disadvantage of mass investigations is the extent of paper required. This would quickly reach enormous proportions and make developing and storing a matter of almost insuperable difficulty. In the desire to undertake mass radiography without the associated difficulties of expense, lack of record, and time involved, the method of photographing the fluorescent image has been the subject of much experiment.

From the earliest days of *x*-ray investigation such attempts have been made. Janker[42] refers to two Italian workers who proposed screen photography a few weeks after Roentgen's discovery, and Bleyer[19] had actually made the attempt within six months. At the same time McIntyre[52] was making similar investigations in this country. The results were disappointing, and Porcher[63] eventually abandoned the method as impracticable. Further work was undertaken by Köhler,[47] Caldwell,[24] Lomon and Comandon,[51] and others, but without success. Russell Reynolds,[65-70] working on cineradiography from 1921, was eventually successful in 1934, but it remained for de Abreu to work out the problem of the still fluorograph that provided sufficient definition. It was obvious that success would not be achieved without screens of greater luminescence, more sensitive films, and lenses of greater aperture.

De Abreu[1-12] started to tackle the problem in 1918 and again in 1924, but met with failure. He did not abandon his attempts, and, collaborating with Siemens, he was able, with the technical improvements that had come about, to carry out his first thoracic survey with "collective fluorography" in Rio de Janeiro in 1936. The results for the first time proved to be satisfactory. The method of screen photography was thereby established for mass investigations. Improvements in detail have been carried out subsequently by Holfelder[37] and Janker.[41] By 1939 de Abreu had no fewer than twenty-five complete units working in Brazil, and the method had been put into extensive use in Germany, as is noted from the discussion at the annual congress of the German Roentgen Society in 1939.[31]

Description of Apparatus

The accompanying photograph (reproduced by courtesy of General Radiological Ltd.) illustrates the essential principles of the apparatus used by de Abreu and by Holfelder. The set is seen to consist of an easily adjustable screening stand, the fluorescent screen being coupled by means of a lead-lined pyramid-shaped cone with a miniature camera situated in the apex. The screen-camera unit is further coupled with the *x*-ray tube so that camera, screen, and tube all move together in the vertical direction. The camera is designed to take 35-mm. film

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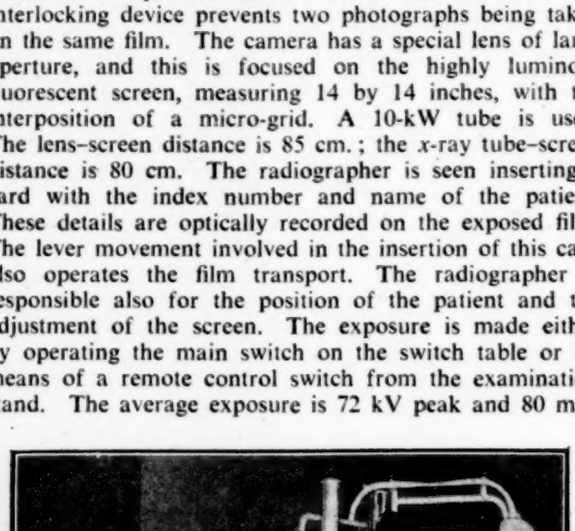
of forty to forty-five exposures. It is fully protected against *x* rays and is easily interchangeable or removable for loading. A counter system is provided to indicate the number of exposures taken on the roll. An electrical interlocking device prevents two photographs being taken on the same film. The camera has a special lens of large aperture, and this is focused on the highly luminous fluorescent screen, measuring 14 by 14 inches, with the interposition of a micro-grid. A 10-kW tube is used. The lens–screen distance is 85 cm.; the *x*-ray tube–screen distance is 80 cm. The radiographer is seen inserting a card with the index number and name of the patient. These details are optically recorded on the exposed film. The lever movement involved in the insertion of this card also operates the film transport. The radiographer is responsible also for the position of the patient and the adjustment of the screen. The exposure is made either by operating the main switch on the switch table or by means of a remote control switch from the examination stand. The average exposure is 72 kV peak and 80 mA,



Apparatus for screen photography.

time 0.3 second. The milliampere–seconds product is kept constant, whilst the kilovoltage is altered according to the depth of chest. The completed miniature radiographs are projected by means of a suitable projector and enlarged up to the normal *x*-ray-film size on a white screen.

The films can be stored in completed rolls or they may be cut into short strips and arranged between cellophane in books. Large numbers of chest radiographs can thus be stored in a small space. The great importance of such documented fluoroscopy in dealing with large numbers of cases is obvious. In viewing the films the immediate object is to pick out the abnormals and not to attempt to arrive at a diagnosis on the spot. All patients with suspect films should be sent for and investigated again as completely as may be necessary, by clinical as well as by ordinary radiological methods. The final diagnosis in any case should only be arrived at by a physician who has had careful regard to the individual patient; and in considering pulmonary tuberculosis it is to be hoped that the mere finding of a dubious pulmonary shadow would not, without supporting evidence, condemn the patient at once to the process of notification and sanatorium treatment.

As to cost, Thomas[62] recently stated that a satisfactory installation could be bought for about £650, and that while the cost of films for radiographing 1,000 chests by ordinary means would be £100 this would be reduced to about £2 8s. by using screen photography with 35-mm. film. It is thought that the average price of a complete machine to-day is in the region of £1,000, and most radiological firms are now producing screen-camera units. It should be noted here—it is also referred to later—that, particularly if rapid work is to be undertaken, the number of clerical and other assistants needed is considerable, and this wage bill must be taken into account. A word of warning is thought advisable with regard to the necessity for standardization of technique. Disappointment and confusion are likely to be the result if an attempt is made to photograph the screen image without a full knowledge of all the detailed requirements. With a screen-camera *x*-ray unit built with the knowledge and experience already accumulated there should be no difficulty. But it should not be thought that the only requirements are a first-class camera, a tolerably good *x*-ray set, and a lot of enthusiasm. Shanks[59] has drawn due attention to this aspect and has made a strong plea for standardization and unified control.

Results of Mass Investigations

It is of interest to consider the extent to which tuberculosis has been brought to light by mass radiography. In England Wingfield, using a portable *x*-ray apparatus, examined over 2,000 secondary-school children and adolescents at work and ascertained that between 0.65 per cent. and 1.08 per cent. showed important lung lesions, the former figure relating to very definite pathological changes indicating tuberculous lesions of adult type. Wingfield thought that a definite proportion of adult clinical cases must be the end-results of latent adolescent disease such as he discovered. D'Arcy Hart and Morland, using full-sized celluloid films in photographing medical students at University College Hospital, have demonstrated that 6 per cent. out of 400 showed important lesions in the chest, and about one-third of the 6 per cent. were advised sanatorium treatment. Dormer and Collender[26 27] and Robinson Thomas have described methods of screen photography but show no statistics of results. Shanks is a strong advocate of screen photography at the present time in all recruits for the fighting Services.

NORTH AND SOUTH AMERICA

In the United States of America, according to Wingfield, Hetherington and McPhedran found practically 4 per cent. of lesions of adult type in the lungs of university students. Wingfield also quotes Soper and Wilson[81] as finding about 2 per cent. in similar investigations. Latterly screen photography has been introduced, and Lindberg[30] and Hirsch[36] have used the method with success.

De Abreu's enthusiasm has led to considerable use of screen photography in South America, the method being adopted in Uruguay and Argentina in addition to Brazil. Barreto,[13] Cabello Campos,[22] Coelho,[24] Mazzei,[53] de Paula,[58–60] and de Paula and Benedetti[61 63] are all enthusiastic. De Abreu's full statistics will be studied with great interest when available; meanwhile he has published his first investigations, mentioning 14,000 cases, out of which he found 3.78 per cent. to be tuberculous. A further series of over 10,000 persons occupied in the food trade revealed 3.4 per cent. of tuberculosis cases. Following de Abreu's work legislation has been introduced in Brazil making it compulsory for every entrant into the food trade to undergo screen photography of the chest, and further legislation is contemplated to

make this investigation obligatory in domestics, teachers, hairdressers, school children, pregnant women, soldiers, sailors, and members of sports clubs.

FRANCE AND BELGIUM

In France fluoroscopy has been the most commonly used method, and out of 25,000 candidates for employment in the French State railways more than 1 per cent. were discarded as a result of the radiological finding after being passed as sound by physical examination.[18] Jalet[12] relates his experiences with routine screening in the North African Army (Algeria) since 1935. The examination takes place not among the recruits but only when, after two preliminary medical inspections, they have become young soldiers living in or near barracks. The point is important when considering the application of similar methods in England. Carrying out between sixty and one hundred screenings an hour, Jalet examined 19,000 soldiers, about one-quarter of whom were French, the remainder natives. He found that 4.6 per cent. either had definite lesions or were suspect. As a result approximately 1 per cent. of the French soldiers were discharged on grounds of tuberculosis, and of these 0.12 per cent. were discovered to have a positive sputum. Similar discoveries in England would have happier results than in Algeria, where Jalet deplores the lack of facilities for treatment, as the result of which the public health service has given up the attempt to follow up cases referred by the military authorities. Fournié and Frezouls[28 29] introduced screen photography into the French Army, while Jullien, Sieur, and Dutrey[45] have made extensive use of routine fluoroscopy in French soldiers since 1926. They report results of over 200,000 examinations, giving much interesting detail and subdivision. It is sufficient here to refer to the largest tabulation, which deals with 145,213 young soldiers at the time of incorporation, as a result of which 265 (0.18 per cent.) were found to have pulmonary tuberculosis with positive sputum. The importance of such discovery of hitherto unsuspected disease needs no emphasis. Ronneaux and others[71-75] have done much work with screen photography in Paris and advocate the method, as do also Maingot[54] and Saye and Caubarrère.[76]

Toussaint,[83] after considerable experience with routine screening, now advocates screen photography in the Belgian Army, as in his view no fewer than 1 per cent. of soldiers developed pulmonary tuberculosis during service. Toussaint quotes Franz and Mueller as having a similar experience of tuberculosis morbidity in the German Army.

GERMANY

In Germany Holfelder and Berner,[40] using screen photography, examined over 10,000 men at Nuremberg in 1938 at the rate of 300 to 400 an hour (2,000 to 2,500 a day). They stress the necessity for a well-trained staff, which should consist of ten men for each screen-camera unit, in addition to clerks; the inspection of films needs four more men and two doctors. Holfelder claims that, after an experience of viewing 1,000 films to become accustomed to the method, it is possible to examine 500 films an hour effectively. Berner[15] included these original cases in a further communication which gives results of over 55,000 examinations comprising about 32,000 military men, the rest being mainly industrial workers. Many of the soldiers were picked men, already examined and screened and under supervision in barracks, yet even these yielded their quota of cases with definite cavitation. The summary of Berner's findings is worth giving in full.

Total number examined	55,666
Negative findings	88.79%
Transitory conditions and artefacts	0.22%
Calcified foci	2.82%
Unhealed and recent tuberculosis	1.36%
Tuberculosis with cavities	0.15%
Cardiac abnormalities	2.27%
Aortic abnormalities	0.56%
Various findings (thickened pleura, azygos lobe, dextrocardia, skeletal abnormalities)	1.93%
Lung tumours	0.005%
Technically spoiled films	1.90%

It will be seen that 1.5 per cent. of cases showed *x*-ray evidence of active pulmonary tuberculosis, while nearly twice as many pointed to heart conditions needing further investigation. Holfelder states with regard to the 10,000 men investigated at Nuremberg that all the abnormals found at screen photography were examined clinically and by full-sized radiography by an independent worker, whose findings "completely coincided" with his own.

Holfelder and Berner have recently published[41] an atlas of screen photography based on an experience of over 900,000 examinations. These examinations include the entire population of the province of Mecklenburg (over 650,000 persons), and this part of the work was carried out in four months. It is stated that the statistics will not be available for some considerable time.

Schulz,[79] an army doctor, advises caution with regard to speed of operation in screen photography. Schulz considers, despite Holfelder, that anything over 300 pictures an hour cannot be obtained satisfactorily. He investigated the Condor Legion on its return from Spain, examining 4,300 men in one and a half working days—that is, thirteen hours—an average of 330 an hour. He managed this with sixteen assistants, but does not think it feasible as a routine to undertake more than 200 an hour. The difficulties at greater speed include vibration of the tube, incorrect adjustment of the screen, patient still breathing, etc. Böhme,[29] Griesbach,[32] Ulrici,[93] Cramer,[31] and Knothe[46] have all used screen photography, and speak favourably of the method. Franke,[30] Schorr and Willbold,[78] and Schopper[81] have all carried out improvements in technique. Bräuning[21] is also impressed with screen photography, but points out that the method is not infallible, as in his experience occasional slight cases of proved pulmonary tuberculosis fail to be demonstrated.

Practicability of Screen Photography

It seems clear that mass radiography yields immensely important findings and that by means of screen photography the method has now come within the range of practical politics. Findings will differ according to the group examined, place, age, sex, and social status, but a method that is practicable and can pick out approximately 100 hitherto unsuspected cases of tuberculosis, about ten of which are likely to show actual cavities, from every 10,000 persons examined can surely be made the basis of a great new step forward in the anti-tuberculosis campaign. Other abnormal conditions in the chest will be found at the same time, and will enhance the value of the investigations, but considerations of tuberculosis are paramount.

Experienced tuberculosis workers have long deplored the lack of early cases of disease. The proportion of adult pulmonary patients treated by the L.C.C. who are early sputum-positive cases or those in which bacilli have not been demonstrated (A + B1 groups) is still only 20 per cent. Approximately four out of every five patients are still moderately or hopelessly advanced (B2 and B3 groups) when first coming under treatment. The ultimate result of treatment in this latter group is naturally disappointing: of those who were discharged from residen-

tial treatment during 1931 only one-third survived five years. If we can get our cases earlier the results obviously will be better; 77.3 per cent. of the patients falling into the earlier groups—that is, A and B1—in 1931 being alive five years later.[49] Screen photography should prove of great help in a renewed search for favourable cases.

Screen Photography and the Armed Forces

Considerable prominence was given last year[48] to the death of a militiaman from pulmonary tuberculosis after having been placed in Grade 1 by a medical board. One of us (F. J. B.) recently made arrangements for further residential treatment for thirteen ex-sanatorium patients who had just been discharged from the armed Forces on account of tuberculosis. Some of these were gross positive-sputum cases before enlistment. Such patients must have withheld vital information and consequently, one assumes, will not receive pensions. But if such florid cases can leak through into the armed Forces one wonders how many cases of slight hitherto unsuspected disease are being similarly admitted. In many ways this is much the most serious aspect of the problem. Many of these unknown sufferers will inevitably break down with frank disease under service conditions, and the State may be called upon to pay millions in pensions, as in connexion with the 1914–18 war. There is also the question of infection. This problem of tuberculosis pensioners cannot be put aside. In the last war, according to Sir Arthur MacNalty, the number of men invalided out of the Services on account of tuberculosis attributable to or aggravated by conditions of service amounted to approximately 35,000.[53] During 1920 more than 3,000 ex-service pensioners for tuberculosis contracted during the war of 1914–18 were admitted to residential treatment under the London scheme alone, and it was not till 1925 that the number of yearly admissions fell below the 1,000 mark. That the effect of contracting tuberculosis during war service is a prolonged social and economic problem can be seen from the 1937 report of the L.C.C., in which it is noted that there were still seventy ex-service tuberculosis pensioners for whom residential treatment had to be arranged during the year.

It is not suggested that screen photography will abolish tuberculosis from the Services, but it would eliminate a sensible proportion of tuberculosis subjects who should not be allowed to serve. It is thought the saving in pensions alone would more than outweigh the cost of the investigation. The administrative problems concerned in the possible application of screen photography now to the armed Forces can only be considered properly by the appropriate authorities. The great difficulties of organization in time of war with everything pressing for attention at the same moment can only be appreciated fully by those with a large administrative experience. It is suggested for consideration that if advance is to be made on these lines the difficulties may be less if the examination is carried out as soon as possible *after* enlistment than if it is attempted before or in conjunction with examination by the medical boards. As the search is for early disease there will be found a great many shadows which need careful watching before a definite decision can be reached as to their significance. It is doubtful if, in addition to difficulties of sheer arrangement, sufficient control could in many instances be kept over the suspect to enable satisfactory assessment to be carried out before enlistment. Apart from the Army, it is understood that the method is to be used in the Navy. Numbers here are smaller, fewer centres are concerned, and consequently organization is less of a problem.

Application to the Community in Peacetime

It seems clear that by the time peace is restored much practical experience in screen photography is likely to have been gained in this country. The application of the method then may well have a striking effect in medical science, from both a diagnostic and a research point of view.

In due course other systems will doubtless come under survey, but the obvious immediate use of screen photography will be in diseases of the chest, and particularly in pulmonary tuberculosis. The theoretical ideal is to take a picture of the screen image of the chest in every member of the community and to repeat this annually. Even with screen photography, however, this task would prove too immense; nor can it be said to be essential so far as tuberculosis is concerned. The spearhead of the attack should be directed towards the still awful toll that tuberculosis takes among young adults, in whom it remains the captain of the men of death.

Figures have already been given which show that the great majority of cases of pulmonary tuberculosis dealt with by public medical schemes are moderately or hopelessly advanced when first coming under treatment and that the results of such treatment are in consequence disappointing. In this connexion an authoritative statement[56] has recently deplored the fact that a greater number of cases are not diagnosed in the earlier stages of the disease. This is thought to be due probably to a continued reluctance of those suffering from the disease in its early stages to seek medical advice in good time. It has always been difficult to persuade even contacts to attend dispensaries. The reluctance of young adults who are not contacts and are not obviously ill is greater still. The apparently healthy do not like going to doctors, hospitals, or dispensaries, and it will need much careful thought, organization, and propaganda to obtain a fair trial for screen photography in peacetime. It has already been suggested that compulsion to undergo screen photography should be introduced.[54] We are absolutely against this. Compulsion is alien to the traditions of this country. It should be unnecessary during times of peace in matters of this nature.

In the past, mass radiography of school children in London has been opposed.[14] Screen photography would seem to bring the subject more into the realm of practical effort. It is still considered that, so far as tuberculosis requiring treatment is concerned, the findings would be slight even with school-leavers; nevertheless it would obviously be a good plan if it were possible to put all children leaving school before the screen camera and try to re-examine them annually till, say, 30 years of age. This should be the main plan towards which future work should be directed.

To begin with, centres would be started in densely populated areas. At these centres school-leavers would have to pass through the screen camera. Year by year they would be invited to come again, and in the early years all young adults who cared to present themselves should be accepted with the least possible formality. No medical recommendation should be required, but the name of each individual's doctor would be noted and all radiological suspects would be referred to him. Where tuberculosis is suspect the suggestion would be made that the local tuberculosis officer should be consulted. The suspect would be followed up to make sure that he had attended for further investigation. The others would be invited to attend again at, normally, yearly

intervals. Young adult contacts of positive-sputum cases of tuberculosis would be invited to attend for re-examination every six or even three months. Attendance of such contacts could easily be linked up with dispensary supervision. It is quite impossible without some such help as this for the present dispensary organizations to examine and re-examine annually the total number of people in close contact with all known cases of the disease. In London alone this problem is immense. Here there are approximately 10,000 positive-sputum cases on the dispensary registers, and it is thought that if all house contacts of all notified cases in London were followed with yearly examinations for five years approximately 60,000 examinations annually would have to be undertaken.[15] Tuberculosis officers would, it is thought, welcome the new method as a valuable help in their work, providing all lung suspects were referred to them without delay.

This help in the more complete supervision of contacts than has been possible hitherto is considered important, as in the age group 16–30 no fewer than 21 per cent. of new male positive-sputum cases and 24 per cent. of similar female cases arise from families in which there has been a recent previously known case of the disease.[16] It is an important public health measure, therefore, to supervise contacts over a considerable period of time, especially—having regard to the frequency of the disease at this period of life—young adult contacts of living positive-sputum cases or of those recently dead from the disease.

Another suggestion is that all young people recovering from "influenza" or "debility," or who have frequent "colds" or persistent coughs, should be encouraged by their doctors to undergo screen photography if it is not thought that their cases are of sufficient import to merit direct reference to the tuberculosis officer. Screen photography following such conditions would yield a fair crop of early cases of pulmonary tuberculosis.

Investigation of Special Occupational Groups

Considerations of research would no doubt indicate from time to time other special groups of the population for investigation. Campaigns could be carried out to investigate particularly susceptible occupational groups. For instance, in London, out of 682 cases of pulmonary tuberculosis in single girls between the ages of 15 and 25 it was found that 50 per cent. were occupied as clerks, domestics, dressmakers, or shop assistants.[17] These groups should well repay routine investigation by screen photography. Investigations might also be conducted on an occupational basis by examining all employees in particular factories or other commercial organizations, and some large employers of labour might find it well worth while to undertake screen photography of all new workers. Philips of Einthoven already do this. This aspect of the matter would have to be approached in England with great caution, as the means of livelihood of the individual may immediately be called into question, and there would have to be suitable safeguards for adequate treatment (if necessary) and subsequent reinstatement, or rehabilitation elsewhere.

Those who favour the method of screen photography as a possible means of *x*-raying very widely, at slight cost, in order to separate the abnormals quickly will have their own conception as to the proper direction of future work. Enough has been said, it is hoped, to indicate that the scope is wide and the possibilities fascinating.

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TRAUMATIC EXTRADURAL HAEMORRHAGE

BY

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AND

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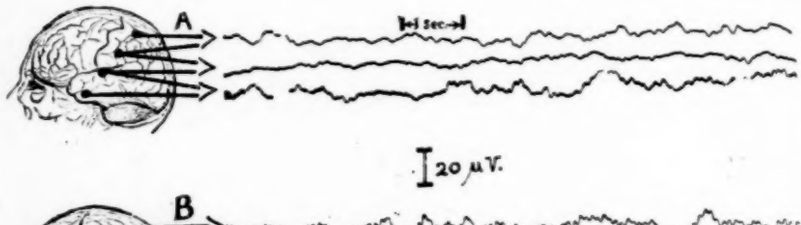
As a general rule common diseases and accidents have been recognized and described for many years, and rarer conditions have been much more recently brought under the notice of the profession. To this rule there are some curious exceptions, and one of these concerns traumatic extradural haemorrhage. Textbooks of surgery fifty years old describe the well-known clinical picture: a brief period of concussion, perhaps only momentary, the lucid interval lasting a few minutes or hours, followed by renewed unconsciousness, with deepening signs of cerebral compression such as stertorous breathing, slow full hard pulse, fixed dilated pupils, hemiplegia, and so on. The trouble is due, of course, to a rupture of the middle meningeal artery, and the syndrome is important because timely operation may save the patient's life. As a matter of general experience, however, this clinical picture is very seldom seen. Only once in nearly forty years has one of us (A. R. S.) met with a typical case that was correctly diagnosed and recovered after operation. Middle meningeal haemorrhage is not very uncommon in the post-mortem room, but in such cases the lucid interval was usually absent and the diagnosis made was cerebral compression of unknown character.



Electro-encephalogram of Case II, showing silent area over the haematoma.

It is the purpose of this communication to describe a case giving the typical history of extradural haemorrhage in which the bleeding vessel was not the middle meningeal artery; and a further case in which the middle meningeal artery was the source of the bleeding, the diagnosis of intracranial haemorrhage and of its location was correctly made in the absence of the textbook signs, and a method of location was used which proved to be more accurate than the neurological findings.

Case I

A young French lady aged 23, on a visit to England, was involved in a motor-car smash at midnight. Her head was injured, but she was able to walk and talk, and went into a house. After a few minutes she became unconscious, and was admitted to hospital about an hour and a half after the accident. When seen at 2 a.m. she was deeply comatose, with widely dilated pupils which did not react to light, Cheyne-Stokes respiration, and a pulse of 100, not of full volume. The scalp was bruised over the vertex and parietal regions. The right arm and leg were slightly spastic, and the left arm and leg markedly so, with exaggerated knee-jerk and extensor plantar response. The rapid advance of symptoms made it evident that there was a spreading intracranial haemorrhage.

At 3 a.m. an operation was performed with novocain local anaesthesia. A small burr-hole exploratory opening was made over the right parietal region; nothing was found except a fissured fracture of the skull. A similar opening was made on the left side. There was extensive blood clot spread out between the dura and the vertex of the skull, derived from the superior longitudinal sinus. The fissured fracture crossed the vertex transversely. The clot was cleared out. The patient died on the table shortly after the end of the operation.

The special point of interest in this case is that there was a typical history of a lucid interval lasting a few minutes, followed by unmistakable signs of compression, but the haemorrhage was derived from the superior longitudinal sinus and not from the middle meningeal artery.

Case II

A working man aged 42 was admitted to hospital, having been knocked off his bicycle the previous afternoon. He was in a very restless unconscious condition from the time of the accident until three days after admission. He then became quiet and sensible, but had no recollection of the accident. After four days he became more restless, and wandered mentally at times. This state persisted for a few days, then he became quiet, but did not regain a completely rational outlook, being rather garrulous.

On admission the central nervous system showed no abnormal signs. There was slight bleeding from the right ear, which cleared up next day. A radiograph revealed a fissured fracture of the right parietal bone. The pulse rate was 84. From the fourth to the seventh day the patient complained of slight headache. The further progress of the case is as follows.

8th Day.—Patient restless; intolerable headache. Central nervous system: pupils were equal, and responded to light and accommodation; no nystagmus; knee-jerk slightly increased on left side; plantar response on left equivocal; tone normal. Pulse rate 60. Lumbar puncture: greatly increased pressure, roughly estimated at 600 mm. water; fluid was yellow.

9th Day.—Patient complained of severe headache, and wandered mentally. Central nervous system as on eighth day. Lumbar puncture: pressure 600 mm.; 60 c.cm. slowly withdrawn.

10th Day.—Patient quieter. Ankle-jerk and knee-jerk increased on left side; plantar response on left side extensor; tone equal. Lumbar puncture: pressure 350 mm.; 60 c.cm. withdrawn.

11th Day.—Headache much relieved. Ankle-jerk and knee-jerk increased on left; plantar response still extensor; ankle clonus present; tone slightly raised; abdominal reflexes all present; no anaesthesia; no astereognosis; no nystagmus; pupils normal; no facial weakness; papilloedema pronounced. Lumbar puncture: pressure 100 mm. Patient continued with no change.

16th Day.—Electro-encephalogram taken. Dr. W. Grey Walter of the Burden Neurological Institute reported as follows: "Electro-encephalograms were taken at the Burden Neurological Institute on November 25, 1939. Records from the left side were entirely normal (see Fig. A). The superior part of the right hemisphere was also normal, but low down on the right side a prominent and well-defined delta focus was found (see Fig. B). The first few delta waves in the

record shown are shaded to emphasize the phase relations of the waves, since it is upon these that the localization is based. Such a slow delta discharge indicates an abnormal area of cortex, but does not give information as to its cause. It is most common in cases of cerebral tumour (Walter, 1937), but comparatively few cases of head injury have been examined, though it is known that in recovered cases the record is normal. The findings in this case suggested that something equivalent to a cerebral neoplasm had arisen in the area shaded in the figure."

19th Day.—One of us (A. R. S.) operated for removal of extradural haematoma. An extradural blood clot about the size of the palm of the hand was found at the site indicated by the electro-encephalogram, over the lower Rolandic area. A small trephine-hole was made over the lower part of the Rolandic area and an extradural clot was seen. An osteoplastic flap with a radius of two and a half inches from the first trephine-hole was turned back. The clot was removed. A posterior branch of the middle meningeal artery was found to be bleeding. This was secured by suture and covered with Horsley's wax. The flap was replaced and the scalp sutured.

After operation a blood transfusion of two pints was given. The patient progressed favourably, and was discharged after four weeks, his mental condition being normal. The central nervous system was normal except for a slight increase in the knee-jerk on the left side.

Discussion

This case history presents a number of points of special interest. In the first place, the clinical picture was quite unlike the textbook description of extradural haemorrhage. There was no lucid interval, and the signs of pressure were psychical rather than physical. The diagnosis was not made until the third week after the injury. In the second place, the neurological signs gave a false location and the electro-encephalogram a true one. Thirdly, the value of a late decompression operation was demonstrated. No doubt the patient was fortunate in that the bleeding ceased before the pressure was raised so high as to be fatal. The evidences of raised pressure were: (*a*) the mental symptoms; (*b*) the exaggerated knee-jerk and extensor plantar response on the left side; (*c*) papilloedema; (*d*) the high pressure of the cerebrospinal fluid. The fact that the fluid was lemon-coloured suggested that the amount of blood that had reached it was inconsiderable, which pointed to extradural rather than to intradural haemorrhage.

Although the condition is not often recognized, at any rate by the majority of surgeons, there are good reasons for considering that persistent rise of intracranial pressure as a result of extradural or intradural bleeding is not very uncommon. In his classical monograph in Choyce's *System of Surgery* the late Wilfred Trotter has a section on the subject of latent subdural haemorrhage, in which he says that these cases may run a course of several weeks or even two or three months. There is a long prodromal period in which the symptoms are "slight, ambiguous, or misleading, and a short period during which serious symptoms rapidly develop and the presence of a definite wide-spread compression becomes manifest. The accident may be severe, slight, or even apparently trivial." The symptoms during the prodromal period are headache and giddiness in many cases, but mental changes are the commonest. "Changes of disposition, attacks of irritability, lethargy, and loss of initiative are amongst the slight manifestations. There may also be transient attacks of mental confusion or of unconsciousness, possibly so slight as not to arouse serious attention. Persistent drowsiness, with perhaps mild delirium at night, occurs in some cases. It is unusual for definite physical signs of compression to be present, but such may come and go in a very surprising and puzzling way. At one examination an alteration of reflexes of hemiplegic type may be found, while the next day no such abnormality can be discovered. Often a fullness of the retinal veins on one side may be found, and as a rarity definite optic neuritis."

At the end of the prodromal period the headache may suddenly increase, vomiting occur, the drowsiness deepen to coma, and hemiplegia develop. The haemorrhage is usually to be found over the lateral part of the cerebral hemisphere.

Wilfred Trotter does not describe similar symptoms due to extradural haemorrhage as in the present case.

The Literature

A number of papers have appeared in recent American surgical literature dealing with chronic subdural haematoma. The most interesting of these is by two Boston neurosurgeons, G. Horrax and J. L. Poppen (1937), who report as many as eighteen cases seen within the space of two years. In some of these the history of injury was trivial and the patient was sent up with a suggested diagnosis of cerebral tumour, arteriosclerosis of the vessels of the brain, or "post-encephalitic state." The symptoms were headache, mental changes, or lapses into drowsiness or coma. These surgeons made the diagnosis by means of exploratory burr-holes over the posterior parieto-occipital regions on both sides, about 4 cm. from the middle line. If a subdural haematoma is present it shows blue-black through the dura. The usual situation of these haematomata is over the upper parietal region of the brain. They are as a rule sufficiently fluid to be washed out by means of a catheter. A perfect functional result is generally obtained. These authors do not refer to any cases of chronic extradural haematoma, but it is evident that the symptoms may be very similar. If in our second case the burr-hole exploration had been made in the situation advocated by Horrax and Poppen the haematoma would have been missed.

In this country Professor Lambert Rogers (1937), like the American writers, has laid stress on the importance and frequency of chronic symptoms due to intracranial haemorrhage following a head injury. In four cases described by him the operation was performed three days, five days, twenty-two days, and three months, respectively, after the accident. In the first and second cases the haemorrhage was extradural and derived from the middle meningeal artery; in the third and fourth it was subdural. In the first case the indication for operation was the development of hemiplegia in a patient who had never recovered from unconsciousness with cerebral irritation. In the second case the patient did not lose consciousness until the fifth day, but complained of headache. The third case had headache for a fortnight and then became drowsy and hemiplegic. The fourth case was suspected of a frontal cortical tumour.

Location by Electro-encephalography

Of perhaps even greater interest than the occurrence of latent extradural haemorrhage is the method of location by means of electro-encephalograms. The necessary apparatus has recently been made available in Bristol at the Burden Neurological Clinic under the direction of Professor Golla. The great advantage of the method is its relative simplicity and harmlessness—quite unlike ventriculography and encephalography, which are not simple, nor free from all risk of unpleasant consequences. It remains for the future to show how accurate location

by this method will prove to be. In the case under consideration the only evidence as to the site of the haemorrhage was given by the fissured fracture of the skull and by the neurological findings—that is to say, the exaggerated knee-jerk and extensor response on the left side. This might have led us to trephine over the leg area. If this had been done the clot would have been completely missed. The fracture, on the other hand, was near the actual lesion. Trephining over the silent area indicated by the electro-encephalogram brought us down upon the very centre of the extradural haemorrhage. It is very clear from these records and observations that when persistent headache or mental changes follow a head injury and do not resolve for days or weeks the possibility of an extradural or subdural haematoma should be carefully considered and steps be taken to investigate the matter. In particular lumbar puncture and electro-encephalography would appear to be indicated. If information can be obtained in no other way exploration by burr-holes after the method of Horrax and Poppen might be justified. Missed cases will probably suffer from persistent headache and mental symptoms, or there may be a late oncoming of monoplegia or hemiplegia. Cases correctly diagnosed can be relieved of all their symptoms by operation.

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TWO CASES OF PERIPHERAL GANGRENE OF UNKNOWN ORIGIN

BY

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The following account of two cases of peripheral gangrene of the ears, fingers, and toes for which no cause could be found is of interest because of the rarity of the condition. Both patients recovered.

Case I

A joiner aged 53 was referred to my ward at the Royal Victoria Hospital, Belfast, on May 22 by Dr. S. B. Carlisle of Dromore, County Down, who stated that some six weeks previously the patient had complained to him of pains in the knees, which were somewhat swollen. Dr. Carlisle gave sodium salicylate and the pains lessened. The patient then developed a purpuric rash, most marked on his legs, and the symptom of haematuria presented. He was kept in bed and given four injections of collosol calcium. A few days later he noticed that his toes, fingers, and ears were becoming purple and even black at the extremities.

On examination on May 22 the man was obviously ill and suffering acute pain, especially in his ears. His temperature was 99.8° and his pulse rate 124. The hands, ears, and, to a lesser extent, the toes presented a striking appearance. Almost the whole of the lobe of each ear was a deep purple colour which merged gradually into a black scarred gangrenous edge. The hands were not equally affected, the left being the more seriously involved. The distal phalanges of the first, second, third, and fourth fingers were deeply gangrenous and, as in the ears, the colour changed from deep black at the fingertips through various shades of purple and red to normal skin-colour at the base. The little finger was most affected on both hands, almost the whole of the digit being involved in the gangrenous process. The surface warmth of the skin was apparently normal right up to the edge of the gangrenous area. The toes were similarly but less affected, and there were one or two purple blotches on the dorsal surface of each foot. There was gross blood in the urine but no free haemoglobin. This haematuria lasted for ten days after admission, and a trace of albumin persisted for three weeks.

The appearance of the hands and ears suggested the possibility of ergot poisoning, but careful investigation of the history revealed no probability of this. The patient had never eaten rye bread and he disliked cereals in any form. His history did not suggest lead poisoning. He was accustomed to drinking ale. He had never complained of having "cold fingers" while bathing or during wintry weather, and on inquiry it was found that no member of his family had ever experienced Raynaud's phenomenon.

He remained irregularly feverish up to a maximum of 100.5° for ten days, and during the remainder of his five weeks in hospital he had an occasional rise in temperature to 99°. His pulse rate varied from 84 to 112. Examination of his blood showed no abnormality. The red cells numbered 4,425,000 and the leucocytes 7,185, with 86 per cent. haemoglobin and 221,000 blood platelets. The differential count was: polymorphonuclears, 62 per cent.; lymphocytes, 30 per cent.; monocytes, 6 per cent.; and eosinophils 2 per cent. The blood calcium amounted to 11.1 mg. per 100 c.cm., and the Wassermann reaction was negative. *X*-ray examination of the chest showed a rather prominent aortic knob attributed to aortic sclerosis, but *x*-ray examination of the limbs showed no visible arterial calcification. Radiographs of the kidneys after injections of uroselectan revealed no definite filling of either kidney, but apart from the haematuria there was no evidence of disease of the kidneys.

For about two weeks the pain in the ears was so acute as to necessitate sedatives, especially at night. Trinitrin tablets were given thrice daily in the hope of promoting vasodilatation. Adexolin capsules were also given thrice daily, and the hands were kept protected in cotton-wool. The condition steadily improved, but the tips of the fingers most affected became jet-black with sharp lines of demarcation. Two of the finger-tips became septic in spite of our precautions, but slowly healed without loss of tissue. The edges of the ears shrivelled, but the circulation gradually became restored with little obvious deformity.

While my patient was in hospital Dr. Thomas Killen kindly gave me the opportunity of seeing a child who had been admitted to Larne District Hospital with peripheral gangrene of very sudden onset. The following is a brief note on the case kindly contributed by Dr. Martha A. Hay, house-physician, Larne District Hospital:

Case II

"A boy aged 5. On admission his hands and feet were painful, swollen, very cold, and almost blue-black in colour. All the fingers were affected from the tips of the metacarpophalangeal joints. The toes and soles of his feet were discoloured, and there were patches of cyanosis of the calves of his legs and half-way up his thighs. There was no sign of any circulation in the affected parts. The night before he was admitted his fingers had been red and painful; the next morning they were discoloured. His father took him to a doctor, and while waiting in the consulting-room the boy's feet began to get blue and the patches appeared on his calves and thighs. While in the waiting-room at the hospital his ears became affected in the same way.

"His temperature on admission to hospital was 100.4° F. Reflexes were normal; pupils reacted to light and accommodation; heart sounds were regular—no murmurs; chest and abdomen showed no physical signs of disease; urine was free from sugar and albumin. There was slight epistaxis on the second day in hospital.

"One-quarter of a trinitrin tablet was given hourly, and the extremities were wrapped in cotton-wool. The next day the colour of the affected parts had improved, with the exception of the third, fourth, and fifth fingers of the left hand, which remained black and had become blistered. Three fingers gradually became less blue until only the tips of the fourth and fifth fingers remained discoloured."

The father was a pigeon fancier and stated that the child had been found eating the pigeons' food. Professor J. Small of Queen's University kindly examined a specimen of the food but found no evidence of ergot. I hear that the patient has made a complete recovery.

Discussion

In the absence of diabetes, gross arterial sclerosis, a history of Raynaud's phenomenon, of any acute severe infection, or of ergot poisoning, it was considered that the cases must be classified in that somewhat rare group, peripheral gangrene without obvious cause. Lewis and Pickering (1934) have classified cases of bilateral gangrene of the digits, apart from the true Raynaud's phenomenon, into: (*a*) bilateral gangrene of digits in the young and with infection; (*b*) bilateral gangrene of digits with haemoglobinuria from cold; (*c*) bilateral gangrene of digits in the elderly and with disease of small arteries. None of the cases which they describe so accurately appear to me to be identical with the cases here recorded. A review of the available literature shows that most of the cases reported can be classified as Lewis and Pickering suggest, but some remain obscure in origin. O'Leary (1937) describes three cases of peripheral gangrene following pregnancy: one of these patients had had a single dose of ergotamine tartrate, which was not considered to be a factor in the gangrene. Many cases have been recorded following pneumonia in children (Uhr, 1938; Smith, 1932; Loubat *et al.*, 1937; Rohmer, 1934); and occasionally in adults (Pagniez, Plichet, and Koang, 1933; Dufour, 1901; Nielsen, 1878). It has also been described following scarlet fever (Cust, 1937; Blumberger, 1936; Dick, Miller, and Edmondson, 1934). In his paper on gangrene in scarlet fever and diphtheria Blumberger says it is a very rare complication, usually massive, even affecting a whole limb. He quotes Schick as having seen only one case in diphtheria in all his experience. It is most apt to occur in the third week of either disease. Bartsocas and Grigoriou of Athens (1937) and Winstead (1935) have described a fatal case of gangrene following measles in a child aged 2, and Stoesser and Lockwood (1938) have recorded a case complicating chicken-pox and associated thrombocytopenia. A gangrenous form of purpura was described in 1884 by Martin de Grimard in his Paris thesis, to which attention is drawn by Paul Chevallier (1937). Other blood changes are occasionally recorded, as in Gorter and Broekema's case (1938), in which eosinophilia in a child aged 2½ was found associated with cyanosis, gangrene of the feet, and increased intracranial tension for no obvious cause. Symmetrical gangrene due to ergot may follow medicinal doses of the drug as in the case recorded by Yater and Cahill (1936), in which gangrene followed the injection of ergotamine tartrate administered for the relief of the pruritus of jaundice. Lead may apparently cause a syndrome: Vigdortschik (1934) has described such a case, and considers that the percentage of gangrene was ten times higher in lead workers than in others. Presumably such cases are associated with arterial disease. Sometimes the cause in recorded cases has remained completely obscure, as in that described by Weissenbach, Martineau, Malinsky, and Brocard (1935), when a man aged 31 developed patches of gangrene in the tips of his fingers, some of the affected fingers having several discrete areas of gangrene separated by tracts of apparently healthy skin. In the absence of demonstrable cause the authors recorded the case as one of arteriolar infection of obscure origin. Mienicki (1934) described the case of a married woman aged 24 who in November, 1933, developed patches of gangrene in the right forearm which healed with much scarring in the course of two months. In May, 1934, she developed the same condition in the other arm. *Staphylococcus aureus* was found, and the patient showed increased sensitivity to staphylococcal vaccine.

The patients whose cases are here reported are now said to be in good health. It will be interesting to determine whether either of them develops the Raynaud syndrome as a sequel to the acute attack.

Summary

Two cases of peripheral gangrene of ears, fingers, and toes are described; no cause could be found, and both recovered.

A brief review of relevant available literature shows that, apart from arteriosclerosis, diabetes, and Raynaud's disease, peripheral gangrene may arise as a result of ergot and lead poisoning, pregnancy, pneumonia, scarlet fever, diphtheria, measles, chicken-pox, and purpura. In some recorded cases no cause for the condition could be found.

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PANIC STATES IN CIVILIANS

BY

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There has been much discussion about the possibility of the war causing an increase in neuroses and psychoses in civilians who are exposed to difficulties and privations and who may be open to direct attack. However, Henderson (1940) believes that the danger of civilian breakdowns is not so great as is sometimes feared, and, commenting on his experience up to the present, says: "All people, men and women, are standing up to the strain of war conditions with fortitude, and although unfortunate and tragic cases occur, yet, on the whole, the position is accepted with equanimity."

Our experience in the Jordanburn Nerve Hospital is that these breakdowns have been uncommon and have occurred essentially in predisposed persons, who have long suffered from emotional instability, neurotic symptoms, and so on, but were able to make a reasonable adaptation. The war has been the last of many difficulties, and it has immediately precipitated the illness. No breakdown has yet been seen in a civilian who was of well-adapted personality before the war. On the other hand, I have tried to exclude from the series patients in whom the war circumstances were only incidental and not the acute precipitating factor. About seven cases remain—civilians whose first actually incapacitating breakdown appears to have been acutely

precipitated by the war. Five records are summarized to show the important predisposing factors that were also present.

Case I: An Anxiety State

A man aged 44, living at Rosyth, became acutely anxious during the bombing raid on the Fleet in the Forth on October 16, 1939. After the all-clear signal he intended to cycle to his work, but "something went wrong" with him and he cycled many miles to the north. He wandered about the country for three days looking for work and sleeping in a deserted cottage. His mind was quite clear all the time and he had a full recollection of what he did. On the third day he returned home, intending to get some more clothes and go away again, but he was too weak to do so. Two days later he was admitted to hospital in a state of fairly acute anxiety and sleeplessness.

Previous History.—Three relations, including the father, were patients in mental hospitals. The parents were theatrical people and the patient was brought up by other relations, who pampered him. As a child he was timid, being afraid of strangers, of the dark, and of blood. He cried easily and was "ragged" at school. At 13 he was put in the care of strangers who drank heavily and treated him so unkindly that he ran away at the age of 15. He was brought back, but ran away again at 17 and found work. In 1915, at the age of 19, he joined the Army and saw much fighting in the front line. He was invalided with pneumonia and had a prolonged convalescence—nine months—although there were no complications. He again saw service at the front, and in 1918 was taken prisoner. He had unpleasant experiences as a prisoner of war. After repatriation the patient settled down to work and was twelve years in his last job. He was married, but there was a complete temperamental incompatibility between him and his wife. The patient was interested in books and in politics, and seemed to take little interest in his family, while the wife was the opposite. Innumerable petty differences arose, which in their sum produced a difficult situation. For years there has been no marital intercourse. Ever since the last war the patient has suffered from such neurotic symptoms as headaches, nail-biting, sleeplessness, irritability, and fear of thunder. In August, 1938, he fell at his work and suffered a compound fracture of the right ankle. He was still in hospital in September, 1938, when it was evacuated. There were difficulties about his compensation. He returned to work. When war broke out he evacuated with his family, but the wife insisted upon their all returning after four days. The patient was most unwilling to do so, and spent his free time gazing eastwards and wondering when the Germans would come.

Progress.—Fear of the war situation remained great and nothing would induce him to return to Rosyth. With psychotherapeutic treatment he slowly and gradually improved, and in February he was discharged to a new home in Dunfermline. He remains apprehensive, but has made an adjustment and has returned to work.

Case II: Neurasthenia

A clerk in a Government office, aged 50, had, after the crisis in September, 1938, to work much overtime, assume greater responsibility, and train new-comers. He became worried, had difficulty in concentrating, and his appetite and sleep became poor. A few days after the declaration of war he had to take sick leave. His prominent complaint was mental fatigue, with slowness and difficulty in concentrating, slowness of memory, and diminished attention. He also had bodily fatigue, impairment of appetite and sleep, headaches, flushing, indefinite eye symptoms, and discomfort in the back. The difficulty with the mental processes was always the prominent symptom; there were no anxious or depressive symptoms and no organic cause for the condition.

This case corresponds closely to the group of cases described by Barton Hall (1939). Hall's patients had been doing skilled responsible work in rearmament, etc., under conditions of rush and overtime. They developed, in the words of Tredgold, "incapacity for sustained efforts, either mental or physical, inability to make decisions, faulty attention and memory, loss of emotional control, and increased irritability."

Previous History.—A sister has had a somewhat similar condition, which has dragged on for almost ten years. The patient had been a shy, sensitive, and self-conscious youth who had some minor sexual difficulties. He served throughout the last war. At the end of 1917 he was invalided with pneumonia and empyema, but was soon able to do farm work. He began to complain of headaches and weakness in the back, without being actually incapacitated. He attended a number of medical boards and received a small permanent pension. After the last war he entered his present employment and found the work not unduly hard. Ever since that war he has complained at intervals of headaches, weakness in the back, flushing, a bursting feeling in the head which he thought might be due to high blood pressure, pains in the arms, and fatigue of mind and body. He drank rather more than he should, felt sexually impotent, and never married. During the last year or two he has been worried about the health and the business affairs of two sisters.

Progress.—The patient improved, returned to work for two months, but is now again incapacitated with the same symptoms.

Case III: A Schizoid State

A conscientious objector aged 28 has been a member of the Methodist Peace Fellowship for two years. Throughout the year before hostilities he was constantly worried by the danger of war and pictured vividly to himself all its possible horrors. After the war began he suffered endless conflict between his convictions and the opposite views of the majority. He analysed most minutely the origin, motives, and purpose of his conscientious objection. This gradually led to an unhappy state of obsessive thinking in which he was obliged to analyse the motive of every little act in his present and past life. He often concluded that his motives were unworthy and selfish.

He first attended in December, 1939. It was found that acute anxiety attacks and somatic anxiety symptoms had begun during the period of worry in the earlier part of the year, and that obsessive thinking had developed as above. There were also distressing obsessive thoughts of a sexual kind. He had short depressed periods in which he had compulsive thinking of a schizoid character. "What if God had manifested Himself in me and I am a failure?" had to be analysed infinitely. In these periods he was persuaded that he was the lowest of the low and that he was doomed to hell; he had feelings of influence, in which something like a voice commanded his movements and suggested he commit suicide. These periods passed quickly, leaving the more usual anxious and obsessive symptoms.

Previous History.—His earliest recollection is of seeing the damage done to buildings in air raids during the last war. The father had a similar breakdown in his youth and has complained of his stomach ever since. He was always a stern, distant, and parsimonious parent. The mother died of heart disease when the patient was about 15. The patient's bodily complaints resemble those of his parents. Throughout his life he has had anxious symptoms, without any actual breakdown. As a child he feared his father, would not go to bed until assured there were no animals about, had many nightmares of lions, and suffered from diurnal faecal incontinence until the age of 12. His work was in a prosaic family business and gave no outlet for his idealism, so he threw himself into innumerable activities connected with the Church. At the same time his conduct was not perfect: he drank a little, although (perhaps because) his father was a proselytizing teetotaller. He was noisy and boisterous, and fond of taking a prominent place in company. There are many details of his rather double character, and upon all this his later obsessive doubts about his motives might be founded. There were important difficulties in his sexual life.

Progress.—In spite of the schizoid symptoms the main features of the case were neurotic, and a mildly analytic approach was adopted. This produced a wealth of material

which I have not space to mention here. This analytic material greatly increases the evidence that the origins of this case lie in the past, although the breakdown was precipitated by war conditions. The patient is now very much better.

Case IV: A Schizoid State

A man aged 24, who had previously followed the sea, joined the Merchant Navy Reserve at the outbreak of war. He took a gunnery course, but when he should have gone to his first ship he developed an acute panic. Admitted to hospital seven weeks later, he was in a state of great anxiety, and hardly able to get his words out. He was afraid of everything, and was agitated and unable to concentrate; he complained of trembling, sweating, and noises in the ears; his sleep was poor; he threatened to commit suicide, and had made an attempt at home by taking aspirin tablets. He expressed quite disordered thoughts about what might happen to him in the future: he might be sent to gaol and starved; he might be put up against a wall and shot.

Previous History.—His people came to this country from Austrian-occupied Poland before the last war. Then and afterwards the family were ostracized by the neighbours, who regarded them as Germans, and the children were confined to the house most of the time. When the patient did go out he addressed the other children in Polish and was laughed at. When he went to school he was avoided, teased, or bullied by the other children, who still regarded him as a German. He was never happy in his own home, as his father had many rows with him and made him feel he was unwanted. Several times he ran away to his grandparents and was finally allowed to stay with them. Returning to his own home when 14, he was so unhappy that he went to sea. At 18 he took a sudden panic for no apparent reason while on board ship, but worked until it returned home. He felt afraid and unable to return to sea after that, and never did. He was not actually incapacitated, but was unemployed for the next four years. His time was not wasted, as he took technical courses, painted, and read much serious literature. Mild ideas of reference appeared—that he was being discriminated against in employment because of his foreign name and that people would think him lazy. Two years ago he obtained a part-time job worth £1 a week, and was content to remain at this. He was discharged at the onset of war, and joined the Merchant Navy Reserve because he was afraid of joining the Army. There were recent sexual difficulties.

Progress.—The patient is still in hospital and has improved very slowly, although he has been removed from the Merchant Navy Reserve for medical reasons. He finds it difficult to believe that this is so and that "they will not come for him again." The anxiety has diminished and the more disordered thoughts are absent.

Case V: Manic-depressive Depression

A woman aged 38 was evacuated to Elgin on September 1, 1939, in the official scheme. She was accompanied by six of her eight children. She became somewhat depressed, spent much time reading evangelistic books, and slept poorly. She worried about how her husband and her two eldest children would manage at home and about reports of air raids over Edinburgh. After a fortnight she felt so unsettled that she returned home, bringing the children with her. She became more depressed and sleepless, and thought every little noise at night was an air raid warning. She had difficulty in concentrating, was unable to do her housework, was at times agitated, and blamed herself for doing wrong and for religious failings. She expressed suicidal ideas, locked herself in the bathroom, and attempted to jump from the window twenty feet above the ground.

Previous History.—A sister had had a "nervous breakdown." The patient had always had a typical cyclothymic disposition. After having diphtheria at 19, she suffered from sleeplessness for some time, but there were no other symptoms then. She has had eight children in her fifteen years of marriage; the last was born in July, 1939, and was weaned just before her admission in October. Throughout her married life the patient was constantly occupied with her household and family duties and there was always a child at the infant stage to disturb her nights. She had no time for recreation. Her mother had died in childbirth at 38—the patient's present age—and she has never adapted herself to this bereavement. For nine months before the war the patient was worried by rumours of conflict, feared for her children, and constantly asked her husband if he was sure there was not going to be a war. She was irritable, but the depression did not develop until she was evacuated.

Progress.—Rest in hospital, simple explanation and reassurance, evacuation of three of the children again, and reference to the birth control clinic led in two months to recovery, which has been maintained.

Summary and Conclusions

Cases of civilians are reported in which the first incapacitating illness followed acute circumstances associated with the war. Such cases are not common in the present stage of the war, in which the civilian population has not suffered attacks from the enemy. Only about seven such cases have been observed at the Jordanburn Nerve Hospital, and all began in the first two months of hostilities—mostly in September.

Panic or fear was a prominent symptom in most of the cases, but several different psychiatric reaction types were seen. The reaction was as often psychotic as neurotic, and mixed types were observed.

Five cases have been reported in detail to show that in every instance the illness was very much predisposed to. Many of the patients showed the reactivation of difficulties in the last war described by Culpin (1940), although in some cases of this series these difficulties were in childhood. All the patients had abnormal—even grossly abnormal—previous personalities. Many factors in their personal lives helped to predispose to the illnesses. Such loaded personalities have difficulty in readjusting so long as war lasts. Of these seven patients, one, suffering from an acute anxiety state without obvious psychotic symptoms but with complete inability to accept reassurance, committed suicide; two are improving but are still in hospital; three have returned to work but still have some symptoms; and only one has made a complete recovery.

These conclusions refer to the present stage of the war and are without prejudice to the view that more numerous and more recoverable psychiatric disorders may occur at a later stage of the conflict, when the civilian population suffers more from its effects or from direct attack.

I thank Professor D. K. Henderson for his advice in the preparation of this paper.

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Queen Charlotte's Maternity Hospital celebrated its bicentenary in 1939, and the report for that year marks encouraging progress. Queen Charlotte's is a hospital of which the Ministry of Health did not demand the evacuation of beds to receive casualties, and therefore the work has been carried on continuously, though with a reduced bed capacity. Work on the rebuilding of the hospital is proceeding and the main block of 196 beds is practically completed. On the outbreak of war nearly all the members of the laboratories staff left to take up duties assigned to them by the Medical Research Council in the emergency public health laboratory service in different parts of the country. The laboratories at Ravenscourt Square are being maintained jointly by the Medical Research Council and the Ministry of Health. Queen Charlotte's gives a number of statistical tables in which costs per patient are elaborately worked out. The average cost of each in-patient per week in the pre-war part of 1939 was £7 18s. 7d., and the average total cost of each patient was £14 3s. 11d., the average stay being 12½ days.

VITAMIN E AND HABITUAL ABORTION

BY

A. L. BACHARACH, M.A., F.I.C.

Claims for the successful use of wheat-germ, wheat-germ oil, and concentrates prepared from wheat-germ oil have been criticized because of the absence of adequate controls. Thus in 1937 it was legitimate to write: "It is necessary to refer . . . to a general difficulty in assessing the results of treating habitual abortion with vitamin E preparations. There do not appear to be available any statistics showing the number of full-term births that would be expected in a group of, say, 100 untreated women who had had two or more successive miscarriages" (Bacharach, 1937). I went on to mention the figure of 75 per cent. of live births reported in most groups of habitual abortants who had undergone vitamin E therapy and to express the view that the available facts were "suggestive that vitamin E has specific uses in cases of this kind."

Malpas's Investigation

Two years later Vogt-Möller (1939), though himself convinced of the value of vitamin E in treating this condition, wrote: "There does not appear to be any information regarding the number of full-term births that might be expected in a group of untreated women with a past history of two or more successive 'spontaneous' miscarriages." At this time Vogt-Möller could obviously not have been aware of an interesting paper by Malpas (1938), who applied statistical methods to the problem in question. He had found 18 per cent. of abortions in 2,000 fraternities examined—a figure very close to those of Whitehouse (17.6 per cent.) and Mall (20 per cent.), both quoted in his paper. In a study of 115 abortion and stillbirth sequences he found that eighty-four had had three or more consecutive failures, and further analysis led him to the conclusion that the chances of full-term pregnancies in untreated cases could be fairly accurately expressed as follows:

After two successive abortions	62 per cent.
„ three „ „	27 „ „
„ four „ „	6 „ „

Malpas then went on to compare these expected rates with the results reported by Watson and Tew (1936): there were 30 per cent. of failures among seventeen treated cases that had had two or more successive abortions. Malpas doubts whether this departs significantly from the figure shown by the table of expectations, and concludes: "It would appear that while the experimental evidence for the role of vitamin E in the maintenance of pregnancy is impressive, the clinical results are far from convincing."

Analysis of Published Figures

Following the appearance of Malpas's paper opportunity has been taken to re-examine not only the results given by Watson and Tew (1935), who have published a slightly longer list than that quoted by Malpas, but also the series of cases reported by Vogt-Möller (1931, 1933, 1936). In making this comparison, however, it was necessary to consider critically Malpas's analysis as well as the case records published by the Danish and the Canadian authors. All cases have been eliminated in which any full-term infants had been born, because it seems that Malpas's figures are strictly applicable only to consecutive unsuccessful pregnancies. Also a slight adjustment has been made in Malpas's expectancy figures. The one woman in a hundred who always aborts is outside the chance scheme, and allowance must be made for this in calculating the expectation. This has been done in the sixth column of the table. There is also internal evidence in his paper for the belief that this figure of 1 per cent. is too low; if it is, then the expectancy rates would have lower values than those given in column 3, Table I, of his paper. This lowering would tell in favour of therapy when comparison is made between treated and untreated cases; any test of the effect of therapy is therefore made more stringent by accepting his figure of 1 per cent., which has been done in tabulating the comparisons in the accompanying table.

Further, in Malpas's original tables the figures of 62 per cent., 27 per cent., and 6 per cent. refer to women who have aborted in the first two, the first three, and the first four pregnancies respectively; in the table the corresponding figures for treated cases are for women who have had two or more, three or more, and four or more abortions. The comparison is therefore obviously weighted in favour of the untreated cases.

Treatment of Habitual Abortion with Vitamin E

No. of Previous Abortions	Vogt-Möller		Watson and Tew	Total per cent. (Weighted)	Expectation Rate	Chances
	Series I	Series II				
4 or more	6/6 (100%)	21/29 (72%)	6/7 (86%)	79% (33/42)	6.5%	About 1 in 10^{20}
3 „ „	8/9 (89%)	30/43 (70%)	10/14 (71%)	73% (48/66)	27.6%	About 1 in 10^{3}
2 „ „	9/11 (92%)	38/52 (73%)	22/29 (76%)	75% (69/92)	61.7%	About 1 in 200

Columns 2, 3, 4, and 5.—The figures in parentheses indicate the percentage of cases: the left-hand figures the number going to term, the right-hand figures the number treated.

Column 6.—These are Malpas's figures adjusted in the manner described.

Column 7.—These are the probabilities that, owing to chance alone, the percentage of full-term births recorded would differ from the expectancy rates by as much as, or more than, the actual differences found.

There seems, from this analysis, to be little doubt that sources of vitamin E had a direct effect in making possible full-term births among women who had had two or more consecutive abortions or miscarriages.

Species Requirements of Vitamin E

For mice and rats the vitamin is essential to normal reproduction. In its absence certain species—rat, guinea-pig, rabbit, and dog—have been shown to develop a characteristic muscular dystrophy. Its successful use in the veterinary treatment of cows and sows has been claimed, particularly by Vogt-Möller. There seems little doubt that it is needed for normal production and hatchability of hen's eggs. Certain American workers (Thomas *et al.*, 1938) claim, however, that its absence does not prevent normal pregnancy in the goat, the sheep, and the rabbit.

There can therefore be no conclusion on general grounds as to its indispensability to the human species, but it is suggested that the analysis given in this paper affords at least presumptive evidence that it is needed for normal pregnancy in women.

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Clinical Memoranda

Modifications in the Technique and Choice of Site for Vaccination

Most people who have been vaccinated bear disfiguring scars for the rest of their lives. The commonness of these scars in others is the only consolation of those afflicted; but the frequency of these mutilations cannot be made a justification for their continued infliction.

For many years the classical site for vaccination has been the upper and outer aspect of the arm, but more recently the buttock, thigh, or peroneal region has often been preferred. Each of these sites has, however, disadvantages which are equivalent to if not greater than the original one. Scars in the buttock and thigh have the advantage of being concealed more than those on the arm or leg, but in infants (and most vaccinations are performed in infancy) the difficulty of keeping the pustule dry in these sites is almost insuperable. There is also the temptation for the anxious parent to inspect the wound each time the napkin is changed; and, last but not least, there is the danger of secondary infection from soiling, which should of itself be enough to condemn the use of these sites. The peroneal region is as easily dressed as the arm, but from personal experience I am of the opinion that scars here tend to be larger and more keloid in type, and have nowadays to a large extent lost their advantage of being less conspicuous than those on the outer aspect of the arm.

In the last hundred cases undertaken I have chosen an area situated in the middle of the medial aspect of the arm at the junction of the upper and middle thirds, with results which have proved most gratifying to the patients, to the parents (where concerned), and to myself. Adults thereby undoubtedly suffer less discomfort from the pressure of clothing upon the involved area, the wound is easy to dress and to keep dry, and the scars are well concealed. In children the site is adequately protected, except perhaps in lifting, when special care should be exercised.

At the time of vaccination particular attention should be paid to the selection of the correct site, so that the point chosen may be exactly in the middle of the medial aspect of the arm; otherwise the scar will eventually prove to be situated more anterior or posterior than is desirable. One other modification that I have found well worth the extra trouble entailed is the intradermal method of vaccination. By this method a small amount of the vaccine lymph is drawn into a fine hypodermic needle attached to a syringe, the needle is inserted just intradermally, and the lymph forced into the skin. This ensures a smaller scar and a less severe local reaction than the older method of scarification, and it has been found to yield equally satisfactory immunological results.

During the course of my duties as a public vaccinator I have been impressed by the number of parents whose chief objection to the vaccination of their children is based on their dislike of the scars. When the site described above is indicated to them the majority consent willingly, and eventually express satisfaction.

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Tearing of the Medulla Oblongata due to a Jerk

The following case of tearing of the medulla oblongata, without fracture of the cervical vertebrae, is perhaps worthy of record because of its medico-legal interest. It appears that no such case has previously been reported in the literature.

CASE HISTORY

A stout man of about 50 years of age was killed in a motor-car accident. The man, a shepherd, was driving sheep over a bridge when a car came from behind. The sheep were startled and ran in all directions; three ran in front of the car. The shepherd ran after them and was struck by the car. The bumpers of the car caught his legs just about the level of the knees, as the result of which the rest of his body was thrown backwards with a jerk and his back met the point of the radiator of the car. The car did not run over the victim. Death was instantaneous.

Post-mortem Examination

A post-mortem examination was performed about six hours after death. Rigor mortis was complete. There were bruises on the right knee, back, and forehead, and a large haematoma on the back. The following fractures were found: simple fracture of the left femur at the lower third; simple fracture of both tibia and fibula of the right leg at the upper third; fracture-dislocation of the spine at the tenth thoracic vertebra; and fractures of the ninth, tenth, and eleventh ribs at their posterior aspects. There was no fracture of the skull or the cervical vertebrae. There was haemothorax in both sides of the chest; and a considerable accumulation of blood in the regions of the pons and the medulla. The brain was found to be severed from the spinal cord by a complete tear at the level of the medulla. Very thorough and careful examination of the skull and the cervical vertebrae failed to show any fracture or dislocation.

CONCLUSION

In the absence of any fracture or dislocation of the cervical vertebrae the conclusion was reached that the tear in the medulla was due to the jerk associated with the sudden changes of momentum during the course of the accident.

I am indebted to the Director, Sudan Medical Service, for permission to publish this case, to Dr. E. S. Horgan, assistant director of research, Stack Medical Research Laboratories, for guidance and encouragement, and to Dr. R. Kirk, bacteriologist, for much help in the post-mortem examination and preparation of this case.

MANSOUR ALI HASEEB.

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Haemolytic Streptococcal Meningitis: Recovery after Chemotherapy

The following case seems to be interesting enough to warrant publication.

CASE REPORT

A male child aged 5 was sent into hospital on October 4, 1939, with a diagnosis of tuberculous meningitis. About seven days before admission he had become drowsy; two days later he complained of abdominal pain, which had been more or less continuous ever since. He was very constipated, vomited once on the fourth day of the illness, but developed no anorexia until the day of admission. An uncertain history of earache at the beginning of the illness was elicited.

On examination the child looked ill and was very irritable. The temperature was 101.2° F., pulse 132, and respirations 22. His skin was dry and inelastic. Head retraction and a positive Kernig's sign were present, but examination of the nervous

system revealed no other lesion. There was doubtful mastoid tenderness, most marked on the left. This was difficult to assess on account of the child's irritability. The right tympanic membrane was rather pink, the left was dark red and bulging.

A lumbar puncture and an incision of the left drum were performed under ethyl chloride anaesthesia. The paracentesis revealed a tough tympanic membrane; and a very little blood-stained muco-pus was obtained by aspiration. The lumbar puncture yielded opalescent fluid under considerable pressure. The pathologist's report was: cells, 430 per c.mm., and a few red blood cells; total protein, 0.06 per cent.; globulin in slight excess; chlorides, 0.69 per cent.; deposit, streptococci and pus cells; cultures, streptococci. Ten c.cm. of 5 per cent. prontosil soluble was given intramuscularly. Before the pathologist's report was received it was thought that the infection was due to the pneumococcus, so sulphapyridine was given by mouth in doses of 1 gramme six-hourly. The following day the cerebrospinal fluid was more turbid, and the ear was discharging very little. It was therefore decided to open the mastoid.

At the operation the mastoid process was found to be almost acellular, but there was pus in what cells there were. The disease had eroded the roof of the antrum and exposed the dura of the middle fossa. The dura showed no evidence of an inflammatory reaction. The wall of the lateral sinus looked unhealthy and the sinus itself appeared collapsed. It was opened, but bled freely.

The child's condition remained critical after the operation, and he ran a swinging temperature for five days. The wound drained cerebrospinal fluid for seven days. After the packs were removed from the sinus groove the wound and external meatus were filled with magnesium sulphate paste, and this was continued for seven days. Very good drainage was obtained by this method; nor, in spite of the sulphonamide medication, did he ever exhibit cyanosis.

A lumbar puncture was performed daily for fourteen days under ethyl chloride anaesthesia. Fluid was removed until the pressure appeared normal, as much as 44 c.cm. being removed at a time. Six days after the operation the pathologist reported that the streptococci grown from the cerebrospinal fluid were haemolytic. At the time of the lumbar puncture on this day polyvalent anti-streptococcal serum was given—6 c.cm. intrathecally and 15 c.cm. intramuscularly, after a test dose of 0.5 c.cm. diluted 1 in 10. The fluid removed at this time was almost clear, and when examined was found to be sterile. After this it became quite clear and remained so, although the pressure continued to be raised considerably.

The dosage of sulphanilamide and sulphapyridine was:

Prontosil soluble	4/10/39	10 c.cm. of 5% solution.	
" "	5/10/39	5 c.cm. of 5%	" morning.
" "	5/10/39	5 c.cm. of 2.5%	" evening.
" "	10/10/39	5 c.cm. of 2.5%	" morning and evening.
Sulphapyridine	4/10/39 }		
"	5/10/39 }		3 grammes.

Sulphanilamide: 1 gramme six-hourly for three days, then 0.5 gramme four-hourly for four days; this was followed, after an interval of twenty-four hours, by 0.5 gramme four-hourly for three days, and after another interval of twenty-four hours by 0.5 gramme four-hourly for three days. In all 39 grammes were given.

The wound finally healed on December 28, 1939, and the child seemed normal in every respect.

My thanks are due to Dr. H. H. Gleave, pathologist at the Royal South Hants and Southampton Hospital, for the examinations of the cerebrospinal fluid. I am also indebted to Mr. Norman W. MacKeith for permission to publish these notes.

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The National Association of Maternity and Child Welfare Centres and for the Prevention of Infant Mortality (Carnegie House, 117, Piccadilly, W.1) has published in pamphlet form, price 6d., a note entitled "Preparation for Marriage," by Mr. Kenneth Walker, F.R.C.S.

Reviews

THE MEDICAL ANNUAL

The Medical Annual, 1940. A Year Book of Treatment and Practitioner's Index. Fifty-eighth year. Editors: H. Letheby Tidy, M.D., F.R.C.P., and A. Rendle Short, B.S., B.Sc., F.R.C.S. (Pp. 604; 62 illustrations; 65 plates, plain and coloured. 20s. net.) Bristol: John Wright and Sons, Ltd.; London: Simpkin Marshall, Ltd.

In these days of rapid advance in all fields of medicine it is becoming more and more difficult for the medical man to keep abreast of what is happening. And it is becoming more and more essential for him to keep up to date, for the new discoveries that are being made are quickly being translated into practical therapeutics. An ever greater precision is being demanded of the modern doctor. Such books as the *Medical Annual*, the 1940 volume of which has now been issued, fulfil a most useful purpose in giving the general reader each year a conspectus of what has happened in the year past. It is, as many readers are aware, no mere compilation of abstracts. Many of its entries are valuable articles written by authorities in the subjects dealt with. This year's volume well sustains the high standard of previous years, and the editors and publishers are to be congratulated on serving the medical profession so handsomely. The *Medical Annual* would be an ideal gift from a grateful patient to a general practitioner.

HUMAN GASTRIC SECRETION

Human Gastric Secretion: A Quantitative Study of Gastric Secretion in Normal and Pathological Conditions. By Bengt J. E. Ihre, M.D. With a foreword by Sir Arthur Hurst, M.D., F.R.C.P. (Pp. 232; 36 figures. 12s. 6d. net.) London: Oxford University Press. 1939.

Advances in the knowledge of diseases of the stomach have tended to follow the two streams of pathological thought initiated last century: the anatomical conception of gastritis presented by Broussais, and the functional idea of secretion and mobility originating from Kussmaul and based on the use of the stomach tube. Improved *x*-ray technique, the gastroscope, and histological examination of material fixed at operation or immediately after death have all contributed, together with the Rehfuss fractional test meal. Developments in the methods used to secure stomach secretion without admixture of food are now being made, alcohol and caffeine solutions having been most often tried.

Dr. B. J. E. Ihre, assistant to Professor Berglund of Stockholm, has put together his own and other workers' experiences on human gastric secretion in normal and pathological states. His material consisted of twenty-four normal healthy young people, and of seventy cases of gastric or duodenal ulcer, gastritis without ulcer, and pernicious anaemia. They were investigated in great detail, a double tube being introduced, one of these to remove the stomach juices, the other to pass into the duodenum; the position of the tubes was proved by the recovery of clear alkaline bile and gastric juice with no bile staining respectively. By continuous aspiration with water suction the gastric secretion is obtained without mixture with saliva. After some fasting specimens, histamine is given subcutaneously, and one hour later sixteen international units of insulin (Leo) intravenously, the gastric secretion being collected over twenty-minute periods. The insulin is considered to represent the vagal juice, the histamine the juice of the chemical phase of

gastric secretion. The duration of a combined histamine–insulin experiment has varied between three and four hours, and the resulting specimens have been subjected to analysis. The methods used were electrometrical, and are discussed in detail in the text.

There is a high level and constancy of the primary acidity and total chlorides despite variations in the rate of secretion, and it is suggested that the hydrochloric acid secretion in gastritis has the same primary acidity as in the normal stomach. Mucous secretion has a buffering action, but of greater significance in the results of the author is that there exists in addition an acid-reducing process which operates without producing any change in the volume of the gastric juice. Diffusion processes are shown to offer a satisfactory explanation and make unnecessary the assumption of an independent diluting secretion. The duodenal reflux is only exceptionally a factor. In gastritis with hyperaemia and more rapid blood flow of the mucous membrane, diffusion processes are likely to be more active than in the normal stomach.

In the author's whole material there is no trace of hyperacidity, confirming Carlson's conclusions of 1916 that there is no evidence that the gastric glands under any pathological condition are able to or do secrete a juice of higher than normal acidity. The majority of the pathological cases show lower acidity than normal in spite of the same primary acidity. This is due to the greater effect of the acidity-reducing factors; increased blood flow and oedema expressing altered permeability, and (as Henning showed) an altered or increased power of absorption from the gastric mucosa in gastritis promoting diffusion, and increased secretion of mucus. While hyposecretion has corresponding gastritic lesions, demonstrable both histologically and gastroscopically, hypersecretion has no such correlation. The latter is present chiefly in chronic duodenal ulcers, but also in chronic gastric ulcers. It is worthy of further study under such carefully controlled conditions as the author has used in his work.

LOCALIZED BRUCELLA INFECTIONS

Localizations Viscérales et Aspects Chirurgicaux des Brucelloses. By R. Michel-Béchet, with the collaboration of R. Puig and P. Charvet. Preface by Professor B. Cunéo. (Pp. 168. $1.15.) Paris: Masson et Cie. 1939.

Knowledge among medical men of the existence of undulant fever in this country is now fairly wide-spread. The occurrence of subclinical and latent infections is recognized by some; but very few indeed are probably aware of the numerous localized lesions, involving nearly every system of the body, to which Brucella may give rise. It is the purpose of Dr. Michel-Béchet and his colleagues in their monograph on visceral localizations and surgical aspects of brucellosis to draw the attention of their fellow practitioners, especially of orthopaedic surgeons, to these less well known conditions. Of special interest is the facial ulcer, with clearly defined margins, situated in front of the masseter muscle, which appears to be almost pathognomonic of Brucella infection and which betokens a grave prognosis. Hepatitis is said to be very common, but involvement of the biliary passages is exceptional. Orchitis is of importance, since even when both testicles are involved and fistulae have formed, natural cure is the rule and subsequent atrophy of the testicle and sterility do not occur.

A considerable part of the volume is devoted to bones and joints, and the various types of osteomyelitis, periostitis, spondylitis, and coxitis are described in some detail. The true nature of the infection of these structures must be recognized; otherwise some of the lesions may be mistaken for staphylococcal or tuberculous infections, or even for osteosarcoma. In general the bone and joint lesions caused by Brucella are not accompanied by enlargement of the regional lymphatic glands, do not cause great destruction of tissue, have a relatively benign evolution, and respond to less drastic treatment than is required for most other types of infection. The volume is illustrated with a small number of photomicrographs and *x*-ray pictures, and forms a real contribution to our knowledge of a disease that is only too often overlooked.

MATERNAL CARE

Maternal Care and Some Complications. The Principles of Antepartum, Intrapartum, and Postpartum Care and of the Management of Some Serious Complications. Prepared by W. C. Danforth, M.D., G. W. Kosmak, M.D., R. D. Mussey, M.D., R. L. DeNormandie, M.D., F. L. Adair, M.D., P. F. Williams, M.D., F. H. Falls, M.D. (Pp. 194. 9s. net.) U.S.A.: University of Chicago Press; Great Britain and Ireland: Cambridge University Press.

This book contains in one volume the two handbooks *Maternal Care* and *Maternal Care Complications* prepared for the use of doctors, interns, nurses, and students by members of the Department of Obstetrics, Chicago Lying-in Hospital, University of Chicago. It has been approved by the American Committee of Maternal Welfare. It is a short book divided into two parts. The first deals with ante-partum, intra-partum, and post-partum care; the second with some complications under three headings—the toxaemias of pregnancy, obstetric haemorrhages, and puerperal infection.

In the first chapter, on ante-natal care, a good summary of the important points is given. The routine questionary which they advise in all cases runs into three and a half pages of the book, and the majority of teachers in this country would not consider such detail necessary, nor would they consider the colour of the eyes or the amount of tea and coffee that their patient takes important enough to deserve a place on a printed form. In all, approximately sixty headings, not to mention subheadings, are given. The desire to have all details tabulated is seen again in their diet for a pregnant woman. But why forbid fresh pork, fried foods, and fat, except milk fat? It seems an unnecessary restriction when the favourite dish might well be one of the forbidden items. It is also strange to hear that a pregnant woman must be specially warned against "riding with her hands in the strap of a street car."

In the chapter on intra-partum care nearly a page is devoted to "the technic of hand scrub," another page to the method of putting on gloves, and a detailed description is given of a method of "sterilizing" dressings, etc., by suspending them over steam for half an hour. ("Warming" would be a more accurate word for such a procedure.) While emphasizing these points the authors only mention "that a nose and mouth mask is desirable," and they say nothing of what constitutes an efficient mask. The more important aspects of forceps delivery, version, breech labour, and prolapse of the cord are also included, yet no mention is made of the management of occipito-posterior positions. When discussing hyperemesis in Part 2 of the book no hint is given that the vomiting might be due to some disease not associated with pregnancy, and surely seventy-two hours is a very long time for a patient with even severe hyperemesis to be allowed nothing but cracked ice by mouth. Throughout the book the dose of pituitary extract is given in cubic centimetres. Though 1 c.cm. of any pituitary extract

generally corresponds to 10 units of pituitrin, this is not a universally accepted concentration, and until it is, the dose should be given in units.

In spite of these shortcomings this book gives a good summary of the care and management of pregnancy, labour, and the puerperium, with valuable details of some maternal complications. The book could not replace the larger works required by pupil midwives in this country, nor could it serve as a book of reference for doctors or trained nurses; it is, however, clearly written, easily and quickly read, and is full of useful facts which would be of value to one who wants to brush up his knowledge of obstetrics in a short time.

PATHOLOGICAL HISTOLOGY

Pathological Histology. By Robertson F. Ogilvie, M.D., F.R.C.P.Ed., Lecturer in Pathology, University of Edinburgh. With a foreword by Professor A. M. Drennan, M.D., F.R.C.P.Ed., and 220 photomicrographs in colour by T. C. Dodds, F.R.P.S., F.I.B.P. (Pp. 332. 27s. 6d., postage 7d.) Edinburgh: E. and S. Livingstone. 1940.

Almost a hundred years ago Julius Vogel produced his *Icones Histologiae Pathologicae*, which may be regarded as the first atlas of pathological histology, and since that date many such works have appeared, but Dr. Ogilvie must be congratulated on producing one of the finest and probably the first to use coloured photomicrographs as illustrations. It is intended as a companion to a standard textbook and should prove of real assistance to students, for the illustrations are well chosen and clear and the text that accompanies them is excellent. The Finlay process has been used, and though there is no doubt that finer colours and greater detail can be obtained with kodachrome, yet Mr. Dodds may well be proud of his work; there are rather too few low-power views, and neither the illustrations of the suprarenal gland in Addison's disease nor that of the thyroid in Graves's disease could be regarded as typical examples, but no doubt some of the plates will be substituted in later editions.

The text is clearly written and the descriptions of Bright's disease and acute pancreatitis are particularly to be commended, but in the section on general pathology some histochemical tests are described of which the interpretations are hardly in accord with modern views—for instance, Lorrain Smith's Nile-blue sulphate does not distinguish between acid and neutral fats but will demonstrate the probable presence of unsaturated glycerides, and amyloid is not stained by virtue of metachromasy but probably by reason of a curious allochromasic phenomenon.

The book is well produced and very cheap, and will be gratefully received by all who find histology a maze of colours and forms.

PROTOZOOLOGY

Protozoology. Enlarged and completely rewritten edition of *Handbook of Protozoology*. By Richard Roksabro Kudo, D.Sc. (Pp. 689; 291 figures. 36s.) London: Baillière, Tindall and Cox. 1939.

Protozoology is a branch of biological science which has direct and indirect bearings on the work of medical men. Among the direct may be mentioned the important bearing of medical protozoology, with its parasites which cause the protozoal dysenteries, the trypanosomiases, and the malarias. The indirect bearings may be much wider in their ultimate effects, but naturally these effects are more difficult to ascertain.

Medical men will not find in this useful volume of Kudo's any detailed information on the pathogenic protozoa which affect man. They will, however, obtain from its perusal a good general idea of the life history and habits, as well as of the relationship, of the various parasites to each other and to similar parasites affecting animals and plants. For those medical men and others who are concerned with the provision of water supplies there is a recommendation that they should study those protozoa which by themselves and also by their effects on bacterial and algal growths may give rise to water troubles such as opacity, odour, and tastes. Special applications of a knowledge of protozoa to preventive medicine, especially in the Tropics, are referred to in connexion with insects. Prevention of insect-borne endemic and epidemic diseases, by the elimination of the vector, has been a constant aim for many years. The perennial hope of the sanitarian in the Tropics is that there may be found natural parasitic invaders which will destroy, in any of their stages, potential insect vectors of disease. Fungal infection of anophelines in Nature has been frequently observed, and Walker's *Coelomomyces africanus* in the larvae of *Anopheles gambiae* and *A. funestus* seems to hold out hope, though not immediate promise. Protozoal infection of such vectors enters into consideration here: certainly the powers of the parasitic protozoa of insects as a means of control are worthy of more serious study than has hitherto been possible. Kudo refers to a series of such protozoal invaders. A few may be mentioned. In *Culex* larvae: *Thelohania opacita, Stempellia magna*; in *Ceratopogon* larvae: *Spiroglugea octospora, Toxoglugea vibrio*; in *Anopheles* larvae: *Nosema anophelis, Thelohania legeri*; in *Simulium* larvae: *Plistophora simulii*; in housefly larvae: *Octosporea muscae-domesticae*.

This volume, being printed on thin paper, is of a very handy size, in spite of its nearly 700 pages. It is in excellent readable print and is illustrated with a profusion of text figures in black-and-white. These range from the simplest anatomical diagrams to elaborate representations of complicated forms.

Notes on Books

In its eightieth year we welcome a twenty-second edition of the little book long known as *Heath's Minor Surgery*, which, like *Treves's Surgical Anatomy* and one or two other well-established books of like calibre, may fairly claim to be a medical classic. Christopher Heath produced the first edition in 1861, and after him the book has been edited respectively by Messrs. Bilton Pollard, Morriston Davies, and Gwynne Williams, who is responsible for the present one. This edition (J. and A. Churchill, 12s. 6d.) shows a certain amount of revision and rearrangement of the text of the twenty-first, and some new illustrations replace former figures. Dr. H. N. Webber has revised the chapter on anaesthesia. In the chapter on fractures the retention of Cline's splint and of Gooch splinting forms a link with the past, but generally speaking fracture treatment is well modernized. We suggest, however, that Lorenz's bifurcation osteotomy is a more satisfactory procedure than removal of the head of the femur as described on page 352; and is it usual (p. 95) to-day for patients admitted to hospital with concussion to have the head shaved and an ice-cap applied as a routine measure? We predict as successful a career for this book as it has had in the past. It is running well for a centenary issue.

The amusing little book which Dr. J. BESANÇON in allusion to the Psalmist has entitled *Les Jours de l'Homme* contains the author's unorthodox views on how to become a centenarian. The work cannot be taken seriously, but will appeal to those who wish to spend a pleasant half-hour in its perusal. It is published by Vigot Frères, Paris, price 15 francs.

Preparations and Appliances

NEW METHOD OF MAINTAINING POSTURE ON A STRETCHER

Dr. W. REGINALD WILSON, medical officer to the Post Office and to No. 1 F.A. Post, Doncaster, writes:

It is hoped that the following suggestions will be found of interest and value to others who, like myself, are studying, and teaching, how best to deal with air raid and similar casualties. I hope, too, that they may be of use to the fighting Services.

For a healthy subject to lie on his back may be harmless enough if he is conscious, but for many who are ill and more or less unconscious it is thoroughly bad. In the first place, the presence of blood or vomit in the throat of such persons exposes them to grave risk. If they lie supine they are in danger of suffocation or of aspiration pneumonia, or both. This must often have happened when vomiting is heralding the return of consciousness in one who has been concussed. Such a patient should be turned on his side in anticipation and secured so. Triangular bandages, for example, should be looped round the lower abdomen and legs, as in Fig. 1, and

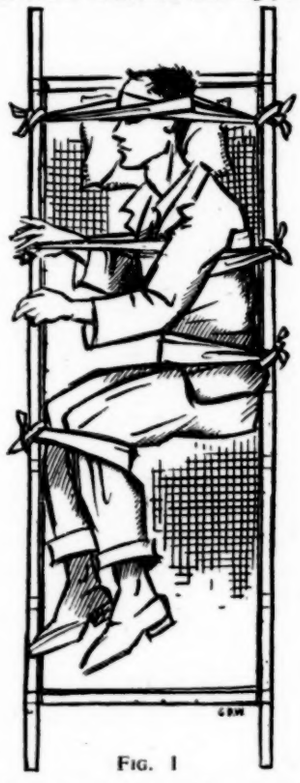

FIG. 1

tied to the opposite pole of the stretcher. The head, shoulders, and feet can be made fast in the same way if need be; and this also allows of the whole being tipped on to its edge, as might be necessary for conveyance through a narrow doorway. The head should rest on a flattish cushion of some sort, which, unlike those in the form of an inclined plane that we sometimes see, will support the whole side of the head, and the neck as well right down to the shoulder. Only thus can complete comfort and relaxation be attained. By still further lowering the head and rotating the face towards the ground the clearing of the throat is made so much the easier. Blood and other material will then flow out of their own accord by gravity or be thrown clear by the effort of vomiting.

For such a patient to lie on his back and merely have his head turned (as advised in some textbooks) is entirely inadequate. In many cases the neck will turn no more than 45 degrees, whereas nothing less than 90 degrees is of any use at all. Fastening patients in position is necessary because in coming round to consciousness they are almost sure to throw themselves on to their backs again. The blankets can be more closely applied if the requisite bandages are laid first across the stretcher.

Specially Designed Back-rest and "Donkey."—In the second place, persons with abdominal injuries, actual or suspected, are, as soon as sufficiently recovered from shock, much safer in the Fowler position. But for this purpose a back-rest of some sort is needed, together with its counterpart, the "donkey." Our rest, specially designed for use with the standard A.R.P. stretcher, requires no rack or other connexion between its two main members. These are frames of wood (Fig. 2), supported on four feet which are hinged on and provided with wooden pegs that project down into the wire meshes. (This form of construction is intended to put the least possible strain on the wirework.) The canvas is detachable, for ease of cleaning. A metal rest would be more easily cleansed from "gas" than wood, but is more difficult to make. We can compromise by covering with a coat of metallic paint, with varnish over it. As to the "donkey," an ordinary pillow or cushion is practically useless. Something firm is needed. The handiest is a tightly folded and rolled blanket with a strong cord run through it and bound round tightly with two or three separate pieces of twine. But our nurses, thinking this an extravagance, have filled cylindrically shaped bags with sawdust, the fabric of the bags being closely woven as for pillows and mattresses. Fastened into the ends are circular six-inch disks of "plywood" with a strong cord through the centres from end to end. The shape

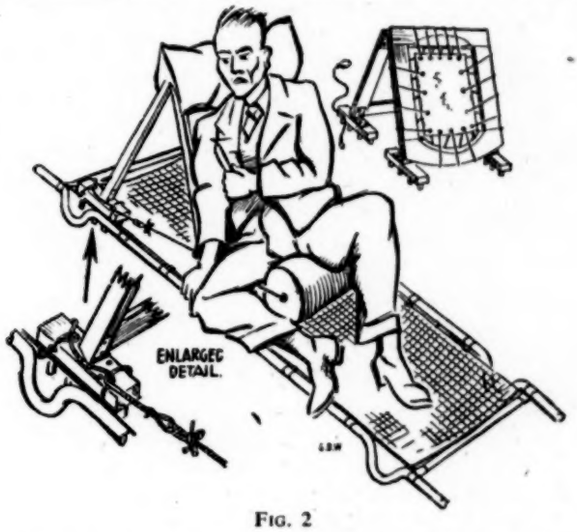

FIG. 2

is further preserved by rows of strings run through across from side to side with a long needle (as used in making mattresses), and tied over little leather washers. When the patient has been set to recline against the back-rest this cylinder is passed under the thighs, one end of the cord being carried up on each side and tightened as required, as shown in Fig. 2. The cord thus not only holds the sick man firmly up to the support, preventing him sliding down, but binds the back feet of the rest securely into the wire meshwork.

Cases of injury to the chest (broken ribs, pneumothorax, haemothorax, etc.) may also need to be propped up, and not only so, but to be turned on to the side at the same time.

Cases of gross spinal injury to be carried face down on top of folded blankets or suchlike should be fastened with crossed loops of bandage to prevent rolling. Other injuries best treated in the lateral position are, of course, wounds of the back of the head, trunk, buttocks, and legs, and such fractures of the ankle as Pott's, when only a side splint is used.

The back-rest is made by Messrs. Walton and Jackson, Town End Joinery Works, Doncaster, and costs from 15s. to 20s. For ease of packing and transport the pins of the hinges can be made to withdraw so that the feet may be detached, each foot and pin hanging by a little chain.

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FOOD-POISONING

Last week, at Plymouth, there was a discussion at the meeting of the Royal Sanitary Institute on food-poisoning and on the supervision of food supplies, both matters of high importance in time of war. Two decades ago the term "food-poisoning" only suggested intestinal invasion by one of the Gaertner group of bacilli. This group, now known as the genus Salmonella, has been further explored until nearly a hundred types have been described. Sir William Savage,[1] when emphasizing the true parasitism of these bacilli, in spite of their presence in the intestines of carriers in the animal kingdom—particularly rats and mice—referred to the manifestations of human infection other than gastro-intestinal irritation—namely, continued fever, septicaemia, arthritis, and meningitis. The risk of food-poisoning is of especial importance in troubled periods when the ordinary routine of preparation and distribution of food may be dislocated. Perry reported a number of outbreaks of Salmonella "food-poisoning" among soldiers in the war of 1914–18, and those in control of the preparation and storage of Army food are alive to these dangers. Almost any form of food may be the vehicle if it has been exposed to specific contamination by the excreta of rodents or by human beings temporarily discharging the specific bacteria as a result of an unrecognized Salmonella infection. Food stored already cooked is the most likely to be a danger in this way, but specifically contaminated raw food materials such as meat from a Salmonella-infected animal, eggs (especially those of ducks), milk, etc., may retain living and pathogenic members of the food-poisoning group after ordinary forms of cooking. Different methods of detecting and isolating these bacilli have been often tested. One worker will plate the fresh faeces or suspected food on MacConkey medium, pick off a suspicious colony next day, and by slide agglutination will, within eighteen hours of receipt of the specimen, give the clinician a provisional diagnosis, almost invariably confirmed by further plating, fermentation, and other tests. By preliminary enrichment, plating, fermentation tests, and final agglutination, another clinical pathologist may give his diagnosis only after several days. A. C. Ruys[2] in several years' work compared different methods—Endo plate, brilliant-green Esbach plate, preliminary enrichment in Müller tetrathionate broth, or this medium with brilliant-green—and found that brilliant-green-picric-citric-acid plates gave the best chance of detection of the Salmonellas. It is probable that no single method at present known will invariably beat all the others, so that a combination of methods is still advisable in routine work.

It is convenient to regard attacks of food-poisoning either as an infection with bacilli which in the course of twelve to eighteen hours produce in the intestine sufficient toxin to cause the characteristic symptoms, or as an intoxication with food containing toxin formed at room temperature before ingestion and productive of symptoms in perhaps one to three hours. Botulism and staphylococcal poisoning clearly belong to the latter group; the position of the Salmonellas is not quite clear. It is certain that the toxic material made by Savage and the polysaccharide complexes isolated by Boivin, Raistrick and Topley are relatively heat-stable and may be irritant to laboratory animals, but whether the Salmonellas can produce in stored food substances which cause almost immediate food-poisoning in man does not seem to be clear, and is certainly exceptional. The view mostly accepted is that the Salmonellas produce their toxin in the intestinal canal. Whether the toxin is produced before ingestion or after, it is clearly the duty of those providing food to protect it from the risk of contact with faeces or urine of rats and mice, and to prevent the use of contaminated milk or other raw food. Food-poisoning by infection with dysentery bacilli was recorded by Savage[3] four times in a hundred outbreaks. Outbreaks of Flexner dysentery may be both clinically and epidemiologically indistinguishable from Salmonella infections. Food-poisoning from *Cl. botulinum* is fortunately exceedingly rare in England, and fewer than half a dozen outbreaks are on record, but both Types A and B of the bacillus have been identified in Britain, and attacks of sudden illness with the well-known blurred vision, diplopia, dizziness, and dysphagia will at once suggest botulism to the clinician. Vomiting and diarrhoea are characteristically absent, making easy the distinction from Salmonella infections.

Since the discovery by J. T. Parker[4] in 1924 that the staphylococcus produces a toxin, the tragic deaths of twelve children in Bundaberg in 1928 after the injection of diphtheria prophylactic containing staphylococcus toxin, and the proof by Jordan, Dack, and co-workers[5] in 1930 that certain staphylococci secrete an enterotoxin powerfully emetic and purgative to man, these cocci have perforce engaged the attention of the bacteriologist. Informative recent reviews by F. C. Minett[6] and J. E. Blair[7] are available. But much still remains for further investigation. The enterotoxin, preformed in the food eaten, gives rise to a typical syndrome. Intestinal pain with vomiting and profuse diarrhoea may occur within thirty minutes to four hours of the consumption of the infected food; deaths are rare and recovery is usually rapid, the patient returning to his work after troublesome dislocation of his life for some hours or one or two days. At a dinner in Canada, described by Roberts,[8] ninety-six persons became ill after eating a coconut-cream pie. Slocum and Linden[9] recorded twenty outbreaks, with

[1] *British Medical Journal*, 1940, **1**, 408.
[2] Ibid., 1940, **1**, 606.
[3] M.R.C. Special Report 92, 1925, London.
[4] *J. exper. Med.*, 1924, **40**, 761.
[5] *J. Amer. med. Ass.*, 1930, **94**, 1648.
[6] *J. Hyg.*, Camb., 1938, **38**, 623.
[7] *Bact. Rev.*, 1939, **3**, 97.
[8] *Canad. publ. Hlth. J.*, 1939, **30**, 590.
[9] *Amer. J. publ. Hlth.*, 1939, **29**, 1326.

1,028 victims, apparently caused by infected ham and beef-tongue. The foods they found to become infected were milk, cream, custard, gravy, cheese, hams, and salt-cured beef-tongue. Unfortunately the salt concentration used for curing, though sufficient to prevent the growth of many bacilli, may not discourage cocci. The identification of the causal staphylococci is not easy. Dolman is quoted as thinking that few strains produce enterotoxin, but Roberts and Wilson compiled a table indicating that of 105 strains, apparently almost all *aureus* when isolated, 47 per cent. made enterotoxin. The final criterion is the power of a filtrate to cause the symptoms in human volunteers. Even this test is not simple, for in the opinion of some workers individuals vary in their susceptibility to toxin; yet only six of the 102 people reported by Roberts escaped with no symptoms. The human test or a similar test on monkeys is obviously impracticable for general and rapid investigation; Dolman fortunately discovered that enterotoxin when injected into the peritoneum of kittens weighing between 400 and 1,000 grammes caused early vomiting and diarrhoea. Most investigators make the reasonable assumption that this kitten test reveals the same poisonous substance which affects man, and the test is, for the moment, accepted. Other methods of differentiating staphylococci are available.

The protection of the community against enterotoxin is not simple. Minett[6] in London produced enterotoxin from staphylococci present in a cow's diseased udder. This danger from milk calls for more careful supervision of cows and also justifies a demand for the New York practice of compulsory pasteurization of all milk. Apparently pure food can be contaminated by food handlers who carry peccant cocci in nose or throat, and Roberts and Wilson relate that the unfortunate owner of a bakery with plant and equipment in excellent sanitary condition remained for at least a year a carrier of the "same strain of staphylococcus" which poisoned many people. Unfortunately the enterotoxin, which may be produced in large quantity in infected food in a few hours at a temperature of 22° C. without evident alteration of appearance or taste, is strongly heat-resistant and may withstand boiling for thirty minutes. Heat sterilization must therefore be applied early, either to the raw food or to the food mixture immediately it is made and before the toxin can be formed. The baker and the house-wife will be pleased to learn that Dack and his colleagues pasteurized puffs and éclairs without detriment to flavour or appearance. If, despite all precautions, the food becomes contaminated liberally with staphylococci, toxin will not be produced if the food is cooled rapidly and stored in the refrigerator.

It is curious that, while staphylococcal food-poisoning is regarded by Slocum and Linden[9] as the commonest form in the U.S.A., the number of outbreaks reported in detail in the medical journals in England is negligible. The implication is that this source of infection may not here be receiving sufficient attention, though the Ministry of Health in annual reports and otherwise directs attention to it. W. M. Scott in a valuable review presented to the sixth Pacific Scientific Congress at San Francisco records between 1929 and 1937 in England 548 outbreaks reported to the Ministry. Of these, 247 were traced to Salmonellas, 59 were recognized as bacillary dysentery, and 142 were "toxin outbreaks." The corresponding figures for 1938 were 138, 72, 8, and 21, the apparent increase being probably due to the greater interest taken in food-poisoning. The articles of food incriminated most often were canned or potted salmon, pressed beef, meat paste, tongue or beef, and meat pies. In sixty-two of the "toxin outbreaks" the food still available yielded cocci in large numbers. In forty-five instances *Staphylococcus aureus* or *citreus* was present, in four streptococci of the enterococcus group, and in some *Staphylococcus albus* alone was found; in five outbreaks only members of the subtilis-mycoides group were present in large numbers, and in default of further evidence had to be regarded provisionally as causal. Only one outbreak was traced to artificial cream, so common a cause in the U.S.A. Perhaps our cooler summer must be given the credit. Some of our manufacturers, schooled by troublesome recurrences and the impossibility of eliminating the numerous carriers from the staff, have installed an almost aseptic technique in the packing rooms, the air being filtered free from germs and the operators wearing masks and gloves.

MASS RADIOPHOTOGRAPHY

Radiophotography, or photography of the fluorescent image produced by an *x*-ray beam, has made rapid progress during the last few years. The idea, however, is not new. Thus in 1896, only six months after the discovery of *x* rays, Bleyer[1] constructed and used an apparatus, which he called the "photofluoroscope," for photographing the screen image. The method proved impracticable on account of the faintness of the screen image obtainable with the primitive *x*-ray apparatus and fluorescent screen, the slow lenses, and the slow plates then available, and was abandoned in favour of direct radiography. It was revived years later, this time, however, for the purpose of indirect radiocinematography, to which Russell Reynolds[2] in this country made such a valuable contribution. In indirect radiocinematography, in the same way as in radiophotography, the screen image is photographed on a miniature film which is enlarged for the purpose of inspection.

The development of both indirect radiocinematography and radiophotography was made possible through an improvement in *x*-ray generators and *x*-ray tubes, the invention of the highly luminous Levy-West "fluorazure" screen, and the manufacture of very fast lenses and highly sensitive fine-grain films. A special "fluorazure" screen was evolved for the purposes of radiophotography. The screen used for routine fluoroscopy is coated with a layer of blue translucent material, the object of which is to reduce a rather pronounced lag or persistence of the image after the *x* rays have ceased to act. This lag, however, does not interfere with radiophotography, and by

[1] *Electric. Eng.*, 1896, **22**, 10.
[2] *Brit. J. Radiol.*, 1927, **23**, 33.

omitting the blue coating and increasing the size of the crystals which form the base of the screen it has been possible to produce one seven times more luminous than the ordinary fluorazure screen. There are now a number of excellent fast lenses of f.1.5 or of even f.0.8 suitable for use with the standard 35 mm. film employed by most workers in radiophotography. According to Potter,[3] however, the 35 mm. film is too small to supply, when enlarged, a satisfactory image of the chest. He therefore recommends a larger film of 75 × 100 mm. A special fast lens had to be made to cover a film of this size: it is similar to that used for night photography from aeroplanes, has an aperture of f.1.5 and a diameter of six inches, and weighs 26 lb. Potter's experiments have further showed that the most suitable film for radiophotography is not the usually recommended panchromatic but the ordinary double-coated *x*-ray film. By passing 400 mA through the tube he was able to obtain excellent reduced pictures of the chest in one-tenth of a second for adults and one-twentieth of a second for children.

The advantages of radiophotography, particularly in routine examinations of the chest, are obvious. Large numbers of individuals can be examined in rapid succession, and the cost of the investigation is lowered considerably. According to Potter a thousand chest radiographs cost about £160 to produce, and a thousand radiophotographs only about £12. There are also the additional advantages of easy filing and storage of records. But the chief value of the method lies in the possibility of examining large numbers of persons in a short time. D'Abreu's[4] work represents the first attempt at an extensive application of "mass radiophotography." The development of his work in different countries has shown an incidence of otherwise unsuspected active pulmonary tuberculosis in from 1 to 4 per cent. of the population, varying with age, sex, and social group. The importance of these findings is obvious. As pointed out by Bentley and Leitner in their paper on mass radiography in to-day's issue of the *Journal*, of all tuberculous patients who are treated by the London County Council only 20 per cent. are early sputum-positive or still sputum-negative cases, while the remaining 80 per cent. are "moderately or hopelessly advanced" when first coming under treatment.

Holfelder[5] applied the method of mass radiophotography of the chest to the whole of the population of Mecklenburg in Germany, and he and his collaborators have examined 644,500 people, representing about 95 per cent. of the total population in that area. They used six transportable radiographic sets, with which they toured the country, examining the people in village halls, schools, barns, or any other suitable building. The assembly of the apparatus in each new place took no more than eight minutes, and by organized team-work it was possible to examine with one apparatus 300 to 400 patients in an hour. It took only four months to examine the 644,500 persons. Incidentally, each person had to contribute 50 pfennig, or about sixpence, towards the cost of the examination, and could obtain an enlarged paper print of the miniature photograph for another twopence. In this way the State was receiving about £25 for each 1,000 cases examined and was apparently making a good profit on the transaction. An analysis of the 644,500 records by Berner[6] shows that only 3.27 per cent. of the photographs proved technically unsatisfactory. About 83 per cent. of the cases were normal; in 3.28 per cent. there was evidence of calcification; in 1.18 per cent. pleural adhesions were found; in 1.25 per cent. active pulmonary tuberculosis was suspected; in 1.25 per cent. there was evidence of cardiac disease, and in 2.87 per cent. of syphilitic aortitis. These are only a few of the interesting findings revealed by this analysis. The cases suspected of having active tuberculosis were further investigated clinically and radiographically.

The early recognition and treatment of pulmonary tuberculosis are important enough in time of peace: like so much else, they are still more important in wartime, and the discovery of clinically unsuspected cases of pulmonary tuberculosis among recruits in the Forces and industrial workers becomes imperative. The strain of combatant service or of particular occupations aggravates the tuberculous lesion, and many patients—roughly between 15 and 20 per cent. according to Braeuning[7]—in whom the lesion might have healed spontaneously under normal conditions of civil life either become chronic invalids or die prematurely of the disease. The Admiralty has already taken steps to solve these problems by instituting routine radiophotography of all personnel in the Royal Navy. This is an example that others no doubt think of imitating.

[3] *Radiology*, 1940, **7**, 415.
[4] *Fortschr. Geb. Roentgenstrahlen*, 1938, **58**, 574.
[5] *Z. Tuberk.*, 1939, **83**, 257.
[6] *Z. Tuberk.*, 1939, **83**, 268.
[7] Ibid., 292.

PROTECTION OF THE EYES IN WAR

Commenting in our issue of November 4, 1939, on the treatment of gas injuries to the eyes, we pointed out that the variety of suggested methods of treatment showed only too clearly the prevailing confusion—a view borne out by the extensive and inconclusive correspondence that followed. The lack of agreement on even fundamental points arises from the facts that there is little substantial experience on which to go and that experimental work appears to have touched only the fringe of the subject. Equally unsatisfactory is the confusion prevailing on other aspects of prevention of eye injuries in war. In our issue of May 18 (p. 825) Sir Richard Cruise described a visor for the protection of the eyes of combatants. It is disheartening to know that a similar visor was submitted by him during the last war and that no clear decision on its value was reached, apparently for lack of any systematic trying-out of the appliance. The newly designed visor has distinct advantages over the previous pattern and has much to commend it; it is to be hoped that it is being thoroughly tested so that its merits may be quickly determined. Protective visors are indeed a greater need now than in the last war, not only because of the extensive local injuries to the face that have already been observed but also because of the greater danger to which the civil population is exposed in totalitarian war. There are thus valid reasons for effective visors as part of the civil

defence outfit no less than that of the combatant. Nor need the visor be of the limited scope that is suggested by Cruise. The extensive burns of the face that have now to be dealt with not infrequently lead to destruction of the lids with exposure of the globe and its loss from secondary infection. On theoretical grounds it might well be argued that some form of face mask would be an advantage to at least some men exposed to particular types of high explosives. All this uncertainty is no ground for satisfaction. Problems which in any well-planned scheme should have been solved in more leisured times have now assumed immediate urgency. The whole issue of ocular injuries for both combatant and civil population is a problem that might well be taken up by some such authoritative body as the Ophthalmological Society or the Vision Committee of the Medical Research Council. The talent to tackle these questions is there; the willingness to explore them need not be questioned; only co-ordinated effort is lacking.

PRIVATE PRACTITIONER AS PROPAGANDIST

There was a time when private practitioners in their individual capacity exercised more influence on local health policy than they do now. Perhaps because they believe that the specially trained whole-time officers of modern times are better fitted than they are to guide the public, or from a desire to avoid embarrassing these officers, or perhaps even from fear that they may be suspected of advertising themselves, they seldom make public pronouncements on health matters now. It is refreshing, therefore, to note Dr. Griffith Evans's departure from this customary self-restraint in the form of a pamphlet on health policy addressed particularly to Caernarvon County Council but also to other Welsh councils.[1] His experience of the county council has caused him some apprehension lest a long-term policy may be obscured and even hindered by piecemeal and *ad hoc* measures. He has therefore thought it worth while to put down on paper what, in his view, ought to be the aim of the local authorities in Wales and how they should try to achieve it. Just as the findings of the Clement Davies Committee of Inquiry into Tuberculosis in Wales might have been the same if its venue had been in England or Scotland, so Dr. Evans's comments have far more than a local application. Most of the pamphlet is devoted to the problem of tuberculosis, which he points out to be twofold—namely, the prevention of massive infection and the maintenance of human resistance. He believes that it is possible to think too much in terms of housing and too little of the general nutritional state of the population and of the after-care of the discharged sanatorium case, which includes the care of his family. He is therefore a whole-hearted supporter of colonies on the Papworth model. In short sections he deals with infant mortality, maternal mortality, and dental treatment, and each of these topics leads him back to his central theme—that health ultimately depends on the consumption of sufficient whole, natural, and fresh foods. He condemns the policy of the Ministry of Agriculture, which has not fostered the home production of such foods, and more especially the Milk Marketing Board for making milk more costly and no more safe, while at the same time failing to improve the position of the producer. The evidence Dr. Evans adduces for some of his contentions may not be accepted as proven by everyone who has studied public health or nutritional science, but it would appear that we shall never arrive at final conclusions on such topics as the predisposing effect of over-milled cereals, sugar, etc., upon dental caries until someone can convince a community that a mass feeding experiment is worth making. Propagandist zeal of this kind, the epithet being used in its best sense, is revealed in Dr. Evans's writing. It is to be hoped that county councillors and the public will read it.

[1] *Notes on Health Policy for County Councils.* By Griffith Evans, M.A., D.M., F.R.C.S., D.O.M.S. With Foreword by Lord Davies. (Pp. 37. 1s.) The Welsh Outlook Press, Newtown, Mon.

CHEMOTHERAPY IN TRYPANOSOMIASIS

The chemotherapy of protozoal diseases in general and of sleeping sickness in particular has been carried a decisive step forward in the brilliant researches described by Professor Warrington Yorke at a recent meeting of the Royal Society of Tropical Medicine and Hygiene.[1] Until 1905, when Thomas[2] demonstrated the action of atoxyl in experimental infections with *Trypanosoma gambiense*, no treatment was known which had any real value against this parasite. His observations may be said to have been the starting-point of modern chemotherapy, since they inspired Ehrlich and led to the foundation of the synthetic drug industry. It was soon found, however, that atoxyl, an aromatic arsenical compound, and its early derivatives, despite their unquestionable value, sometimes gave rise to serious disturbances of vision and readily induced arsenic resistance in the parasites. Their action was also very uncertain in the latter stages of *gambiense* infections, and they were of little value at any stage of *rhodesiense* infections. An important advance was the American discovery of tryparsamide, which, as shown by Pearce,[3] is capable of influencing *gambiense* infections even when the nervous system is invaded by the parasites; but it is, again, an aromatic arsenical compound and has all the other disadvantages of these drugs. Further derivatives, such as orsanine, first used clinically by Ledentu and Daude,[4] and neocryl, introduced by Yorke and Murgatroyd,[5] have similar limitations, which appear, therefore, to be inherent in this chemical group. Bayer 205, which is of a different chemical type and is free from many of the disadvantages associated with the arsenical drugs, is also of little practical value in the later stages of sleeping sickness, probably because of its low penetration into the central nervous system. The discovery by Professor Yorke and his colleagues of an entirely new class of trypanocidal agents is therefore of great potential value, and the way in which the discovery was made is of considerable scientific interest. Some thirty years ago Biot, Biot, and Richards[6] observed the importance of glucose for trypanosomes, and attention was focused on the matter when Yorke, Adams, and Murgatroyd,[7] while developing a method for maintaining trypanosomes *in vitro* at 37° C., demonstrated how great was the amount of sugar utilized by the parasites. The effect of hypoglycaemia-producing substances in animals experimentally infected with trypanosomes was examined by N. and H. von Jancso,[8] who found that synthalin exerted a definite therapeutic effect. The correct interpretation of this observation was given by Lourie and Yorke[9] when they showed by *in vitro* investigations that synthalin was in itself directly and powerfully trypanocidal. Synthalin consists of two guanidine groups connected by an alkyl chain of ten carbon atoms, and as

[1] *British Medical Journal*, 1940, **1**, 410.
[2] *Proc. roy. Soc.*, B., 1905, **76**, 589.
[3] *J. exp. Med.*, 1921, **34**, Suppl. 1.
[4] *Ann. Inst. Pasteur*, 1926, **40**, 830.
[5] *British Medical Journal*, 1936, **1**, 1042.
[6] *C. r. Soc. Biol.*, Paris, 1911, **71**, 369.
[7] *Ann. trop. Med. Parasit.*, 1929, **23**, 501.
[8] *Z. ImmunForsch.*, 1935, **86**, 1.
[9] *Ann. trop. Med. Parasit.*, 1937, **31**, 435.

this structure differed so widely from that of any known trypanocidal agent, King, Lourie, and Yorke[10] prepared and investigated a number of related derivatives, such as guanidines, isothioureas, amidines, and amines connected by alkyl or alkylene chains of varying lengths. One of the diamidine compounds, 1:11-undecane diamidine, was exceptionally active against trypanosomes, and was also active against malaria. Shortly afterwards Ewins prepared a series of related compounds in which the central inert carbon chain was replaced by aromatic linkages. Certain of these preparations, and in particular 4:4'-diamidinostilbene, have very remarkable therapeutic properties. Not only are the aromatic diamidines active against experimental infections with trypanosomes but they exert a definite therapeutic effect on babesia, leishmania, and certain malarial infections. Clinical trials against sleeping sickness and kala-azar have already been instituted, and the preliminary results are not unhopeful, especially when it is remembered that the compounds at present being used are only the first of a chemical series which may be modified still further.

PROSTATIC CALCULI

As a rule prostatic calculi are found in conjunction with either benign enlargement of the prostate or a gland which has been the seat of chronic inflammation. In such cases the symptoms are those which may be ascribed to the prostate itself, but chills and fever may be initial indications of prostatic calculi and may appear quite independently of any urinary symptoms. T. L. Pool and G. J. Thompson of the Mayo Clinic[11] suggest that in any case of unexplained fever in adult males radiographs should be taken of the prostate. Small calculi which may pass casual examination may be found if the films are carefully inspected. Bouts of chill and fever are due to subacute prostatitis associated with calculi which lie within infected cavities in the gland. Only in selected cases is removal of prostatic calculi indicated, and the Mayo Clinic workers favour a transurethral operation. After removal of the calculi the cavity from which they have been extracted is "saucerized" by means of the resectoscope. These authors publish details of three cases in patients aged 50, 56, and 54 respectively, in one of which the stones were so large that it was necessary to push them into the bladder and then crush them with a lithotrite. The cavities in the prostate were then obliterated by removing the overhanging tissue with the resectoscope. The removal of calculi can be carried out with greater accuracy by the transurethral route than through an incision in the perineum, but a sound knowledge of urethral anatomy is essential, and care must be taken to avoid the adjacent rectum or a troublesome and distressing fistula may result.

HIGH-ALTITUDE FLYING FOR WHOOPING-COUGH

It is hoped that the recording angel will make an entry on the credit side for those German aviators who have assisted in the study of the effect of high altitudes upon whooping-cough. F. Pflug and H. Jungheim of Berlin report[12] their observations on 136 patients between the ages of 7 weeks and 49 years treated in this way. Usually one flight only was undertaken, to a height of approximately 16,000 feet and lasting sixty minutes. To get over the well-known seasonal variations in the course of whooping-cough two separate periods of the winter of 1938–9 were chosen, but the results were approximately the same in each. Some of the patients had received other treatment before the flights, and this was continued without alteration afterwards. It was found that about 82 per cent. of the patients showed a definite improvement within five days of soaring into the blue. While few paroxysms actually occurred during the flight the immediate effect was often to make the condition slightly worse for a short period. Improvement then set in and was maintained. It appears that most of the patients were in the second or third week of the disease. In fact the best results were obtained—namely, a 100 per cent. improvement in a few days—in those in the second week of the paroxysmal stage. The general improvement appeared to be much the same at all ages. Objective evidence was sought in the leucocyte picture, and it is claimed that a reduction in the lymphocytes by about 20 per cent. was found on an average in the first few days after the flight. No satisfactory explanation is offered for the results obtained, though such factors as lowered oxygen tension and altered humidity in the air at high altitudes are mentioned as possibilities. Psychological influences are held to be excluded because forty-six of the patients were under 3 years of age, twelve of them being infants, and the results were as good as with older children and adults. Eleven patients failed to benefit; in seven others who showed no benefit from one flight a second expedition to the higher reaches of the atmosphere brought about definite improvement.

[10] *Lancet*, 1937, **2**, 1360.
[11] *Proc. Mayo Clin.*, 1940, **15**, 77.
[12] *Klin. Wschr.*, 1939, **18**, 1247.

NOTICE TO CORRESPONDENTS

The need for strict economy in the use of paper for all purposes was emphasized by the Control of Paper Order made by the Ministry of Supply, which came into force in April. In view of the restrictions now imposed on the use of paper, and the increase in the rates of postage which came into operation on May 1, it will no longer be possible to acknowledge the receipt of letters and memoranda, etc., offered to the *British Medical Journal* for publication. The space devoted to correspondence has had to be curtailed, and readers are urged once again to be concise in all communications addressed to the Editor.

At a meeting of the Royal Society on May 23 Dr. Francis Peyton Rous of the Rockefeller Institute for Medical Research, New York, was elected a Foreign Member in recognition of his distinguished contributions to pathology, and particularly his pioneer studies on filterable tumours. The same honour was conferred on le Duc de Broglie, member of the French Academy, for his work on *x* rays and *x*-ray spectroscopy; on Professor Ross Granville Harrison of Yale University, chairman of the National Research Council of the United States, for his pioneer work on tissue culture and his researches on experimental animal morphology; and on Professor Gilbert Newton Lewis of the University of California, a founder of the electronic theory of valency and of a number of important branches of general chemistry.

The Secretary of State for the Colonies has appointed Sir Wilson Jameson, M.D., F.R.C.P., as his Medical Adviser, in succession to the late Dr. A. J. R. O'Brien. The appointment is a part-time one, and Sir Wilson Jameson will continue his duties as Dean of the London School of Hygiene and Tropical Medicine.

BLOOD TRANSFUSION FOR THE PRACTITIONER

A SIMPLE DOMICILIARY METHOD

BY

GUY R. BASHFORD, M.B., Ch.B., M.R.C.S.

Dr. Paolo Ravenna's (1939) recent observation, based on five years of blood transfusion service in Turin University Medical Clinic and in the Spanish War, that "the dramatic improvement which follows the pure-blood transfusion rarely appeared after stored-blood transfusion," prompts me to give a detailed account of whole-blood transfusion as it may be practised in the home, in the hope that it may afford convincing evidence of its simplicity and safety. The method cannot, however, be adapted for continuous administration, which in any case is best carried out in an institution. The technique is far from new, but its advantages, especially the relative ease of preserving sterility, to my mind make it the ideal, if not the only, method applicable to general practice.

As a house officer I was accustomed to using citrated blood by the gravity method, but since 1932 I have carried out about twenty-five transfusions of whole blood in the homes of patients suffering from conditions ranging from post-partum haemorrhage to traumatic shock and collapse, and from a ruptured varicose vein to recurrent bleeding from a tooth socket. Often there was no alternative to carrying on in the absence of skilled assistance, and the conditions were frequently far from ideal in rural districts. Only thrice was the transfusion carried out purely as a life-saving procedure (and in each case it was doubtful if the patient would have survived the disturbance and delay associated with removal from home), but the restorative value of transfusion in the other cases of blood loss was always very striking also. The following technique was used:

Method of Procedure

As soon as it is evident that transfusion may be advisable 1 c.cm. of the patient's blood—often obtainable without venepuncture—is placed in a small conical vessel (I have often used an egg-cup in an emergency) and allowed to clot. Relatives are nearly always to hand, and such as are agreeable to act as donors are asked to remain close by while instruments, sterile normal saline, and sterile liquid paraffin are prepared. This preparation usually occupies from ten minutes to a quarter of an hour, by which time enough of the recipient's serum has separated to enable the corpuscles of the prospective donor to be tested against it directly, on a glass slide with the aid of a low-powered microscope (or even a loupe). Time-consuming blood-grouping of both donors and recipient is thereby avoided, and the possibility of error reduced to a minimum.

Within twenty minutes, as a rule, the donor has been chosen and the instruments have been prepared. Meanwhile a second bed, or a couch, has been placed for the donor alongside the patient's bed, with a small table between, before which the operator, also between the beds, will sit. While the sterilized saline and paraffin are cooling, the skin over the median basilic veins of the adjacent arms of the donor and recipient is prepared, and a few minims of local anaesthetic are injected intradermally at the proposed puncture sites. The 5-c.cm. or 10-c.cm. Jubé two-way syringe, which is to the surgeon what the auxiliary fire-pump is to a member of the A.F.S., is *securely* attached to the two rubber connecting-tubes, each eight inches long, which are in turn securely connected to the needles supplied with the Jubé syringe. Tourniquets are applied.

The whole apparatus is filled with liquid paraffin, care being exercised not to allow the needles to touch any unsterilized object. (Absolute sterility of the exterior of the syringe, of the rubber tubes, and of the hands is difficult to maintain under conditions in which blood transfusion is likely to be carried out at home, and in fact is not necessary.) The liquid paraffin is now rejected, leaving the whole system lined internally with paraffin to prevent clotting. The syringe is filled with normal saline and half emptied, the piston is rotated to a position halfway between the two cocks, and the syringe is placed on the table. By this time, with luck, the veins are prominent and the punctures can be made painlessly. An assistant is entrusted with preserving the surgical cleanliness of one needle while the other is passed into the recipient's vein. If the patient is collapsed this is not always easy, but the process should be simplified by the use of Mr. Ronald Edwards's (1939) recently described vein-seeker. The piston is rotated so that, on withdrawal, suction is exerted on blood in the punctured vein, in order to confirm that the needle is really in the vein, the tourniquet is loosened, and the piston is returned to the neutral position with the syringe again half full of saline and the needle in the vein. The process is now repeated in the donor's arm, though in this case the needle should be passed towards the donor's hand, and the tourniquet should not be removed until the transfusion is completed.

So far the patient has not benefited, but in favourable circumstances these preliminaries will not have occupied more than thirty minutes—in hospital they would have occupied only fifteen minutes, provided enough serum had separated by that time—and usually the need for transfusion of blood is not so extremely urgent that an interval of thirty minutes is dangerous. The syringe is now operated at such a rate that not less than fifteen minutes is expended in transfusing a pint of blood, care being taken that the blood flow is in the right direction—an easy source of error with a Jubé syringe, and obviously a very undesirable one. By counting the number of actions of the syringe piston the volume of blood given is controlled.

Comment

The rest of the procedure requires no description from me, as my object in describing the technique in detail up to this stage is to draw attention to the ease, speed, and safety with which whole-blood transfusions can be carried out even in extremely difficult surroundings. Contrary to expectation, there seems to be ample time in which to seek the second vein, for I have had practically no trouble from clotting in the first needle. Occasionally towards the end of the transfusion the syringe begins to work a little stiffly as blood finds its way between the piston and the barrel wall.

All the sterilized apparatus can be accommodated in the metal case in which the syringe itself is supplied, so that if the saline and paraffin are carried in the bottles in which they were previously sterilized the transfusion can be made under circumstances in which stored blood could not possibly be given—for example, where there is no running water and no source of heat (for, provided the rubber tubing is short, the donor's blood passes through the pumping system rapidly enough for the risk of rigor from the cooling of the blood before injection to be negligible). On one such occasion the transfusion was given in a tent on a gipsy encampment.

The method should be of great value in the event of unusual demands on the ambulance service in air raids causing dangerous delay in removal of the more distant casualties to hospital, for it can be used with perfect safety even in the absence of sterile towels, provided reasonable care is exercised.

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ON DISORDERS OF ARTICULATE SPEECH*

BY

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The aim of this paper is to show why some people, born and brought up in the same environment as ourselves, may yet develop a special form of speech, such as lisping or one of the allied disorders. For our purpose it is, I think, advisable to look first at the way in which Nature has developed articulation. The word "articulation" is of Latin origin; *articulus* is derived from the stem *ar*—"to join." When used to describe sounds the adjective "articulate" means "divided into distinct† and significant parts": "speaking intelligibly." The verb "to articulate" means the action that leads to the state expressed by the former. The word "significant" implies a conscious intention to make signs, and thus also a relation whose parts are: (i) the individual who makes the signs, and (ii) the individuals to whom they are directed.

Evolution of Articulation

To understand articulation, therefore, we must study its evolution—that is, the universal process of orderly change, through which characters have been modified from generation to generation through internal and external factors (Osborn). In accordance with Osborn's definition, given above, we can neglect those sounds which are produced by inanimate Nature, since they are "the effect of the physical impact" and merely report "what has happened or is happening" (Wilson, 1937). They are not significant. (The same applies to plant life.)

Any sound produced by animals—groans, grunts, etc.—is a sign of their present or immediately past state, but its chief meaning lies in its reference to some future event of which it is the intentional or purposive cause (Wilson, 1937). Are these sounds articulate? We must say that they are, for they (1) possess clearly perceptible differentiating characteristics, and (2) they are also significant in their parts. If we are tempted to say that they lack significance in their parts we do so solely through our own senses and differentiating faculties. But what about the animals to which they are directed? We may begin by saying that the sounds of animals are articulate as regards their own world but not always with regard to ours. In so far as we admit ourselves to be living in another world, we do not always know whether these natural sounds are, as Wilson (1937) assumes, "indefinite in significance" in point of being "the kind of the specific cause" of some state of mind. The discussion of the glottal stop will later illustrate this conclusion.

Before discussing human speech we have to recall a second rule—namely, Haeckel's fundamental principle of biogenetics: the development of the individual resembles a condensed recapitulation of the probable evolution of the race. Thus in the development of human speech we can distinguish various states, some of which have been mentioned already, since according to the principle given above their traces must be found to some extent in animal speech.

The first sounds to be observed in a baby of any race are cries which apparently correspond solely to emotional states of mind (pain, cold, hunger, etc.). These cries are at first mere reflex activities. It is difficult to decide whether they are articulate or not, since as a rule our acoustic apperception is not sufficiently trained to differentiate distinct parts (see definition above). We are also almost certain that they are not purposive—that is, significant. If we thus regard the natural cries as inarticulate this may be applied to the very first weeks of life. The fact that they are reflex activities at this stage is intelligible, since they represent a step in the recapitulation of phylogenetic development (animals' cries). It is widely believed that most reflex activities have once been conscious and purposive movements.

"Between the second and fifth week," according to O'Shea (1907), "the primitive squall begins to be differentiated to denote special forms of discomfort . . rapidly, so that soon all the child's vital experiences may be revealed in specialized ways." Among the special forms I may mention one particularly, because it shows already a primitive, and certainly very ancient, symbolization. This is the "glottal stop," which originally had been a necessary step for protection of the breathing organs against any danger. Since danger is connected with fear the glottal stop becomes a symbol of it and, in the end, of all negative emotions. Hence this primitive feature reappears in children or adults whenever negative emotions prevail—for example, in advanced stages of stammering, in accordance with a rule I shall mention below. To call this type of utterance "articulate" fits in with our definition. Further, all small children show a certain preference for nasal reasonance in song and speech, like primitive peoples.

Soon the child produces the same groans, grunts, cluckings, and crows that are characteristic of animals, as we might expect in accordance with Haeckel's rule. There can be no doubt that these are a further step in developing and increasing the number of articulate sounds—that is, distinct, significant, and purposive utterances. The last characteristics are revealed by the child's behaviour.

Prelinguistic Babbling

In the babbling period (prelinguistic babbling, primordial babbling of Sully) there appear—from about 6 months—the so-called primitive sounds, Kussmaul's (1877) "Urlaute." This author assumed that these reflect the primitive sounds given to mankind and developed during innumerable generations into the sounds contained in the languages of to-day. Fenton (1925) verifies that "there is great richness and variety in the babble as a whole. Usually it contains a far wider range of separate sounds than the child will have use for in later life." Another characteristic of this period is lallation (lalling)—that is, the reiteration of syllables.

Is this primitive speech articulate? One is tempted to say "Yes," since even the untrained observer notices the constituent syllables clearly. Hence they are articulate even although they are not always contained in the phonology of the mother tongue or even in European languages. On the other hand, these utterances are not at first purposive. Thus we must logically regard them not as articulate but as gradually becoming articulate, without changing their phonetic character.

By comparing the characteristics of primitive languages—for example, that of the Hottentots—with those of the babbling period—namely, primitive sounds and the repetition of syllables—we can convince ourselves that this period also is a recapitulation of one of the earliest phylogenetic periods of linguistic evolution. Bearing in mind our definition, we can agree with Tracy (1893), who asserts

* A paper read before the Remedial Conference of the Association of Teachers of Speech and Drama.

† Distinct—that is, possessing differentiating characteristics, clearly perceptible or discernible by the senses or the mind. (*Oxford Dictionary.*)

that they are articulate, only with the above mental reservation. We are thus made aware of the paradoxical fact that any sound may lose its articulate character, without changing its acoustic qualities, as soon as its mental background alters. According to Pollock (1878) a distinct intonation is to be observed from the age of 9 months. Imitation plays an important part from the same age (Wilson, 1937).

Linguistic Babbling

In the next period, which I should like to call linguistic babbling, in antithesis to prelinguistic babbling, the child attempts to express his wishes, and later his ideas, by using the sound symbols heard in his surroundings. This is effected merely by adapting the sounds heard to those already acquired, and is shown by the fact that the first purposive utterances (words) are, on the one hand, reduplicated syllables and, on the other, clear imitations of the words and sentences used by the grown-ups.

We must not forget that during the periods already discussed the child has been growing up. In particular its mind has gone through many experiences which lead it from individual life to social life. At the age of about 18 months the child begins to realize that he is a member of a group. This group seeks to enforce upon the individual certain rules of conduct contained in the group code, although these rules are not usually codified. "So far as the code goes, the members of a group are expected to behave alike" (Woodworth, 1922). This limitation requires a functional adaptation of the child's mental faculties. On the other hand, "the child's role is to be little and dependent, but, no less, to grow and become more and more independent" (Woodworth, 1922). The way in which the child solves this dilemma will depend on the skill of those around him in helping him to compensate his natural inferiority complex (which itself is not the cause of neurosis) and to find the best way to raise his position in society. Speech, to be sure, is such an important social link that the child has to adopt the group modes of behaviour in this respect or else the *raison d'être* of speech to a great extent disappears. There emerges a struggle between (*a*) naturally developing functions and (*b*) rules imposed by the social group. If the second tendency is victorious, if the rules of the group prevail, the natural development is stopped. This checking yoke is imposed by the most important conscious developmental factor of mankind—social feeling, produced during the evolution of herd life. In his very first attempts to get into harmony with his environment the child experiences a real defeat. The more complete this defeat the nearer to that which is standard does the child's speech afterwards become.

Conventionalized Speech

The articulatory movements of the growing individual—of whatever kind they be—become gradually canalized, and what was once forced is now conventionalized. This conventionalized speech is then the standard speech—in other words, a speech which answers to the rules and authoritative or recognized examples of correctness and perfection whose definitive degree is imposed by the social group. It is evident that the characteristics mentioned above are mere ideal qualities, imagined as perfect or fully developed. The linguist recognizes that there cannot be any speech standard. Language and speech change day by day, and each speaker has got his own patois, altering at each moment. The deviations of course are, and must be, very slight, so that they cannot always be differentiated. As a rule the dialect of the ruling class becomes the standard speech. During childhood the ruling class is represented by the parents, nurses, etc., of the child. It will, I suppose, be agreed that they are not always the perfect examples that the definition assumes. But even if they present standards, these can never be reached or equalled, since this means either that they are perfect or that they have attained some definite degree. The former is impossible, since Nature does not know any finality—it is always changing; while the latter presumes a forced and thus unnatural stop.

The natural evolutionary tendency which is opposed to the characteristic conservative tendency of the grown-ups produces a paradox, excellently described by Curtius. Thus we are tempted to reduce the normal phonetic laws to a striving after comfort and ease—qualities that are almost abnormal. And the conservative tendency should, on the one hand, preserve the sound from atrophy and, on the other hand, interfere abnormally with legitimate tendencies leading to decay. Marty also has pointed out that any "logical" consideration of speech must be rejected if it regards as abnormalities, even as speech defects, all linguistic appearances not in accordance with certain patterns.

It is obvious that we must abandon this method of valuing deviations and disorders in favour of an evolutionary consideration of the psychic and linguistic aspects of speech.

Hughlings Jackson's Theory of Dissolution

Having dealt with the evolutionary phase I pass on to consider the disorders of articulation. In order to do this I have to introduce a third evolutionary rule which is most helpful in examining nervous disorders. This rule, clearly expressed in Hughlings Jackson's (1932) theory of dissolution, states that in the event of any nervous disturbance affecting an individual he behaves as though he had fallen back to an earlier stage of evolution, the characteristics of which therefore reappear.

Thus, in accordance with Hughlings Jackson's rule, we may find different kinds of articulation corresponding to the particular stage in evolution to which the individual has fallen back, whether the cause of this be organic or functional. Going down step by step, we shall get evidence that these forms of deviation are at the same time also degrees. May I recall, in order to be clear, that the meaning of "step" and "degree" was originally the same, meaning stages in an ascending or descending scale or process. To recognize this is of great diagnostic value, since we are thus able to assess through the symptoms the severity of a disorder in regard to speech and its mental background and to become independent of the often unreliable history. We can, further, make a more correct prognosis.

If the first of the two early conflicting tendencies prevails—namely, naturally developing functional tendencies—the child goes his individualistic way; he becomes unsocial, showing then certain neurotic symptoms such as being easily frightened, isolated when with other children, preferring to be alone, completely occupying the attention of the mother, and showing a wish to remain a little child (a dyslalic child of 6 never remembered how old he was, and constantly asked his father, "How old am I?"). Such patients often admit frankly that they have no wish to improve in their speech (Goldberger, 1933).

Paralalia: the First Degree of Disordered Articulation

These patients show us the first degree of disordered articulation, dyslalia (or paralalia)—that is, "the production of a

distinctly different sound from that desired or the constant substitution of one sound for another" (McCarthy, 1930) with all the characteristics described above. This disorder will increase in severity with an increase in the number of sounds concerned and in proportion to the amount of their deviation from the sounds of the mother tongue. The severest degree is called idioglossia, denoting an entirely new individual language not used in the group. On the whole such speech may be characterized by placing it under the catchword of "gibberish." The utterances are, in fact, more or less impossible to understand.

If we investigate this kind of speech by careful use of the rules for description and explanation of unknown languages we soon discover that it is by no means without form or rule, but is actually the outcome of certain definite laws governing it as a whole, like any other language. A few examples may make this clear.

An Austrian child 7 years old said "tishe" for *Kirche* (church). The sound-change of *ch* (like in German *ich*) into *sh* is due to the influence of the palatal vowel which follows it. The *t* substitution for *k* may be caused in the same way. It is interesting that many children who had been able to articulate *k* and *g* during the prelinguistic babbling period must learn their articulation again at this time; but Gumpertz's (Stein, 1937) palatographs show that the child's supposed attempt to use the "easier" articulation (*t*) for the more difficult (*k*), mentioned in many textbooks, is rather deceptive. The transition of *k* into *t* is gradual, since we find *k*- and *t*- articulations at the same time. The acoustic impression, therefore, is also deceptive. On the other hand, we find the *k* articulation clearly influenced by the surrounding vowels.

The sound-changes mentioned above may be easily compared with historical changes, such as Latin *canis* (dog), French, *chien*; old Bulgarian *dŭsa*, corresponding to a presumed *duchĭa* (soul)—the stem *duch* remains unchanged if not influenced by the suffix *-ia*: *duch* (ghost). The change of *Schere* (scissors) into "tere" and later into "tjere" proves that events of this kind progress much quicker and in a more unchecked way than in the evolution of language, where we can follow them up. Comparing the change of *Spatz* (sparrow) into "pas" and that of *Susi* (Susan) into "Tuti," we come to the conclusion that the child's inability is not due to difficulties in articulating, since *ts* = *s*, and *s* = *t*.

The same sound-series often substitutes different etymons—for example, "to" for *schon* (already) and *komm* (come), "bulei" for *Bügeleisen* (pressing-iron) and *Spielerei* (toys), "tleidn" for *Kleider* (cloths) and *Kreide* (chalk). The utterances thus become ambiguous: compare the Latin *centum* (hundred) and *quinque* (five), which both must have become *činč* in Rumanian; but *činč* for *centum* has been replaced by the Slav *suta* to avoid ambiguity. It has become clear that dyslalic children do not avoid this, because they live in another world (Stein, 1937).

Is this speech now articulate? We must answer, "Yes." In all respects it is distinctly marked and divided into definite and significant parts (of whatever kind they may be from the grammarian's point of view). The individual really wants to utter his thoughts and also expects them to be intelligible. This kind of speech can be followed like any other foreign language if the addressed person understands it. It must, however, be admitted that, owing to certain deviations of articulation and grammar, this speech is not intelligible to all members of the social group in which the speaker has grown up.

This tendency to sound-change, on the other hand, plays an important part in the evolution of normal languages. Many deviations considered abnormal in regard to their over-rapid development and their excessive difference from the group speech appear to be normal changes from the historian's and the linguist's points of view. Left to develop by themselves, these deviations, as in some African tribes, become a new language after about thirty years. Rousselot found that *l* had been made into *j* in a French patois from one generation to the next. And this must have been considered abnormal by the older generation. Lucian, in a pleasant dialogue, describes how the Sigma has become plaintive about the Tau, which has expelled it step by step from the nouns and verbs of its inheritance.

Progressive Paralalia

If we consider the peculiarities of symptomatology it may be made clear that paralalia is not a regression. This is shown by the fact that the sound-changes are the same as those regarded as progressive in language. The only apparent difference—namely, the great speed of the sound-changes—is not essential in paralalia but helps to explain the paradox that a rather advanced stage of speech is at the same time a disorder. It originates from the destruction of the harmony of the two functions of language—an instrument of thought and gesture and a means of communication. The former appears rather advanced; the latter is more or less useless. In consequence of the psychic peculiarities described above speech strives forward unchecked, hence too rapidly, while its social function gets lost. Expressed in physiological and anatomical terms, higher levels of the brain cannot acquire, or have lost, their influence on the activities of lower ones. Paralalia, therefore, regarded from the psychological, analytic, physiological, and evolutionary angle, certainly possesses an infantile character. It may be caused through functional disturbance, by deficient maturation, or by organic disease. Delayed speech also plays its part in impeding psychic and linguistic adaptation. The same vehemently progressive paralalia can be found in such mental diseases as paranoia (a psychosis characterized by fixed and systematized delusions) (Warren, 1935) if the patient's attitude is childish. Advanced cases of general paralysis of the insane show similar articulatory deviations (not caused by nerve paralysis!)—for example, "tanjiff" (*Schlangengift*), "fripipp" (*Friedrich*), "jutbitter" (*Gutsbesitzer*), "autetiehn" (*ausgestigen*) (Liebmann and Edel, 1903).

Functional cases of developmental paralalia which have not been treated systematically improve in proportion to the extent to which later education tries to socialize them; but in the meantime deviations of articulation have become ingrained so deeply that the patient cannot find the proper co-ordination, though he may try to do so. This inability is aggravated by the fact that the acoustic impression of his own wrong sounds becomes so strongly connected with his deviated articulation, and also with the written letters and sounds heard from other people, that he loses the realization and the appreciation of his articulatory defects. Many cases of sigmatism (defective utterance of the sound *s*), particularly the palatal sigmatism described by myself (*s* = *s*), and kappacism are the results of such developments (Stein, 1925). Functional treatment, therefore, will not always succeed unless psychotherapy is added.

Other Stages of Speech Disorder

Second Degree: Nasality with Preserved Articulation.—This is very often to be found after organic disease affecting the cortical layer of the brain (encephalitis) without causing mental defects, although feeble-mindedness also sometimes shows this symptom. This disorder of articulation is easily interpreted from Jackson's point of view if we consider the predilection of savages and primitive peoples for nasal speech and singing.

Third Degree: Persistent Prelinguistic Babbling.—The symptoms have already been described. This disorder can also be found in deaf children, since the primordial sounds of this stage are not due to acoustic imitation. In older children it is always a sign of imperfect maturation; if they are deaf, prelinguistic babbling disappears in the course of their general development and prepares the way for dumbness. All kinds of degeneration, such as dementia paralytica, mental enfeeblement, etc., which begin after speech has been acquired, lead sooner or later to this stage. For the same reason we may find babbling temporarily as a symptom of poisoning of the cerebrum—for example, by alcohol. Clicks* signify a lower

* "A clicking sound, or sharp non-vocal sound formed by suction, with the sudden withdrawal of the tongue from the part of the mouth with which it is in contact." (*Shorter Oxford English Dictionary.*)

degree of this third stage, since from the phylogenetic standpoint they mark the earliest period—what we might describe as one of the archetypes of articulation. Most imbecile children are affected.

Fourth Degree: Purposive and Significant Intonation without Distinct Articulation.—This occurs in cases of severe developmental check or organic brain disease acquired in later life.

Fifth Degree: Grunts, etc.—These are more or less purposive sounds referring to passing emotional states. If behaviour shows them to be reflex, and thus without significance, they must be regarded as inarticulate. They are to be found in idiocy.

It is hardly necessary to say that my classification is not put forward as final and conclusive, and the degrees are not inevitably fixed. Many exceptions may occur and additions may prove necessary. In any case, I hope to have contributed to the systematizing of our knowledge of articulatory deviations. Our search after a proper diagnostic classification must always be led by therapeutic purposes. Taking the view that dyslalic patients live to some extent in a world of their own, we must not only try to cure the expressive side of speech but also do our best to lead the defective speaker back into our world.

Summary

Articulate speech communicates thought and feeling and develops from the harmonious interaction of biological forces in the individual and controlling forces in the social environment. Parallel processes can to a certain extent be traced in biological evolution.

Disorders of articulate speech seem to be due to a disharmony between the two groups of forces mentioned above, and are manifestations of a personality which is incompletely integrated from the social point of view. These disorders can be graded in accordance with Hughlings Jackson's theory of the dissolution of the nervous system, since each disorder corresponds to a phase in the development of function in the nervous system. The greater the disorder of speech the lower the level of function to which speech has regressed.

Dyslalia, a certain type of nasality, prelinguistic babbling, clicks, intonation without articulation, and grunts can be explained on this basis.

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The membership of the Committee appointed by the Minister of Labour and National Service to advise him on medical questions arising in connexion with the examination of men by civilian medical boards appointed under the National Service (Armed Forces) Act, 1939, was set out in last week's *Journal* at p. 875. The joint secretaries of the committee are Dr. A. E. Hallinan, *M.C.*, of the Ministry of Health, and Mr. E. W. Hoyle, of the Ministry of Labour and National Service.

GROUP MEDICAL PRACTICE

AN AMERICAN STATEMENT

The carrying on of practice by organized groups of medical practitioners has been a growing feature of recent medical developments. In this country such a group has usually been constituted by a number of general practitioners, in partnership or in systematic association, one or more of whom specialize to a definite extent, but not exclusively, in certain branches of medicine or surgery; or by a number of practitioners each of whom is a specialist in his own branch who jointly undertake the complete examination of patients but do not as a rule assume the responsibility or do the work traditionally assumed by the general practitioner or family doctor. In the latter case the group may be organized in connexion with a hospital or a public clinic, or may form an establishment of a purely private character. In America, of late, there has been a tendency for the organization of such a group to be more varied and for its functions to become more mixed. Some undertake to provide general medical care under voluntary prepayment schemes. In a recent pamphlet on *Group Medical Practice*, giving a "tentative statement of principles and procedures," published by the Committee on Research in Medical Economics, New York,[1] it is held by the special committee studying group practice that this is the proper line of development; that the professional group should supply preventive services to individuals, general medical care and specialist services, and that it may be well for a group to arrange with public or voluntary agencies or with organized bodies of patients on a prepayment or other basis. It is contemplated that medical groups may sometimes be organized under Governmental agency or non-medical auspices, with a responsible executive officer. Some of these conditions would not be welcomed in Great Britain and, indeed, they are unnecessary in view of the established National Health Insurance system and the extensions thereof which must come about soon after the end of the war. It is clear, however, that group practice has definite advantages, though these are accompanied by serious dangers and disadvantages. The chief of them perhaps is the dissipation of individual responsibility and personal relationship. It must be remembered also that group practice, even more disastrously than individual practice, if only at its weakest point, may become substandard; and that, far from reducing the cost of proper medical care (one of its purported objects), it may very easily increase it. These points are not overlooked, though they are minimized, in the "statement" of the American committee. It is noteworthy, nevertheless, that they insist upon the principles that "a particular physician should be responsible for the supervision of each patient," that "continuity of relationship between the patient and a particular physician should be encouraged," that this "co-ordinating physician" should be "the patient's adviser whenever needed," and that he should be "chosen by the patient or by the physician referring the patient to the group." This is in accordance with the best professional opinion everywhere; but there is little or no advantage in such further pronouncements as that standards of work should be high, that equipment should be adequate, that technical personnel should be competent and sufficient, that administration should be economical, that the remuneration of the staff should be appropriate.

[1] 9, Rockefeller Plaza, New York City.

NUFFIELD PROVINCIAL HOSPITALS TRUST

MEETING OF REGIONALIZATION COMMITTEE

The initial meeting of the Central Regionalization Committee of the Nuffield Provincial Hospitals Trust, formed to carry into effect the one and a quarter millions of Lord Nuffield, was recently held at Oxford. Mr. W. M. Goodenough, chairman of the Trust, explained that the committee had been appointed in conformity with the provisions of the trust deed. It was proposed to create fifteen or sixteen regional organizations in the provinces and in Scotland and Northern Ireland, but Mr. Goodenough said that some time might elapse before definite recommendations as to regional areas could be made. The trustees suggested a short-term programme of organization which might usefully be undertaken within the next few months, to be followed by a long-range programme to be carried through in 1941 and 1942. He added that the trustees desired that the Regionalization Committee should give early consideration to the relation of regional and divisional councils to public health authorities and ancillary medical services, to contributory schemes operating within the areas, and to co-operation with public health authorities. A Medical Advisory Committee had been set up with Sir Farquhar Buzzard as chairman, one of its duties being to inspect and report on conditions obtaining in a region or division and generally to offer opinions on matters of medical policy and interest in so far as they concerned the actions and purposes of the Trust. The appointment of a Parliamentary Committee to watch the special interests of provincial hospitals was being considered.

Machinery for Co-ordination

Various subcommittees were appointed at the meeting, and reports were given on regional conferences which have been held lately at Leeds, Newcastle, Cambridge, Maidstone (Kent Regional Council), and Exeter, Truro, and Plymouth (South-Western Area). It was also mentioned that a conference of representatives of the Scottish Department of Health, local authorities, and the Scottish Branch of the British Hospitals Association was to be held at Edinburgh, to be followed by a further conference before the end of the summer to which proposals for the regional grouping of Scottish hospitals would be submitted for consideration. In each area the principle of regionalization has been adopted, and the response to Lord Nuffield's appeal for co-operation between voluntary hospitals and public health authorities has been most satisfactory.

Mr. S. P. Richardson, chairman of the Sunderland Royal Infirmary, has been appointed chairman of the Regionalization Committee, and Sir Kenneth Wigram, chairman of the Royal Cancer Hospital, has been appointed vice-chairman. Among those invited to serve on the committee are Dr. Peter Macdonald and Mr. R. L. Newell, representing the British Medical Association, Mr. R. G. Hogarth, member of council of the Royal College of Surgeons, and Professor A. W. Sheen, provost of the Welsh School of Medicine. The committee at present numbers twenty-four.

During 1938 maternity and child welfare work in Madras progressed steadily under district boards and municipalities following the advice of the director of public health. It is gradually being realized that a scheme of public health work is incomplete unless it includes provisions for maternity and child welfare. Uninterrupted and successful work carried on under some local bodies has proved a valuable incentive to others to assume like responsibilities. Voluntary associations have handed over their work, existing funds, and, in some cases, buildings, to the local bodies in seventeen municipalities and four district boards during the last few years. Lieutenant-Colonel H. E. Shortt, I.M.S., states in his report for 1937–8, as director of public health, that the Corporation of Madras has appointed an *ad hoc* committee to reorganize its work according to the health policy of the Madras Government. The number of women medical officers, health visitors, and midwives has grown rapidly in recent years, and on the whole the amount of money spent on child welfare has been suitably increased. Five more municipalities and two more district boards have decided to build child welfare centres.

Reports of Societies

CLINICAL TEACHING OF SOCIAL MEDICINE

At a meeting of the Section of Epidemiology of the Royal Society of Medicine on May 24, Dr. J. ALISON GLOVER presiding, a discussion was held on the clinical teaching of social medicine.

Dr. N. M. GOODMAN of the Ministry of Health defined social medicine as one aspect of preventive medicine. It was concerned with the social factors which affected a patient's health. At present the student and doctor might be shown a picture which was incomplete, and in some cases the omission of certain relevant details might be disastrous to a true appreciation of the patient's condition, treatment, and prognosis. The clinical teaching of social medicine had been linked up with clinical medicine in some countries. As far back as 1905 Dr. Richard Cabot in Boston began to use the medical social service and its personnel in his teaching, and Cabot's work had spread widely in America. At Yale since 1929 a practical course had been instituted in which the student undertook a study of infectious or contagious disease, ante-natal care, dietary deficiency, mental hygiene, and so forth, in relation to social environment, making his observations clinically with the help of his clinical teacher and socially with the help of the almoner, and drawing up a report which was afterwards discussed by a combined group of clinicians and social workers. At the University of Brussels a somewhat different approach was made by Professor René Sand. There a patient was brought into the lecture room and a brief clinical outline of the case given by the house-physician or registrar in charge; then the social history was described by the social assistant, Dr. Sand afterwards giving a brief lecture on the aspects of social medicine illustrated by the case. At other places on the Continent, notably at the University of Nancy, the social and medical aspects of teaching were closely linked. Students gained from this teaching, first, the knowledge that there was such a thing as a social aspect; then they became familiar with the organizations which could help their patients; they gained an insight into the ancillary work of the almoner; and from the study of particular patients they might come to take an interest in particular problems of preventive medicine—for example, the differential mortality of classes and of occupations. It was said that the general practitioner knew his patient. It was true that he knew the house the patient lived in, and whether he was a private, an insurance, or a public assistance patient, but often he knew very little of the social agencies and persons who might be brought in to help. In towns his horizon was frequently limited to the local hospital and the relieving officer. The speaker pleaded that those responsible for teaching students should consider whether the clinical teaching of social medicine could not be introduced or extended with advantage in the medical schools.

Miss CHERRY MORRIS, as a hospital almoner, said that the clinical teacher could do much to point the way whereby a knowledge of social services might be obtained by medical students, especially by using the almoner's department and insisting on having relevant notes on social history, treating them as seriously as he would treat a report from the *x*-ray department or the pathological laboratory. In certain hospitals in the United States the social worker as a matter of course formed part of the teaching of the ward round. The idea had been mooted of having a consultant almoner to be employed by approved societies for insurance patients. The governing boards of some hospitals had been quick to realize the assistance which almoners could render in hospital administration, but too constricted a view of the almoner's duties was taken in many cases, and the Ministry of Health, in urging the appointment of almoners at sector hospitals in order to assess patients, had, no doubt inadvertently, added to the impression that the almoner's function was to collect money, for no suggestion was made with regard to co-operation with clinicians to get the best results of treatment.

A "Twist" to the Curriculum

Sir WILSON JAMESON said that the question which had been worrying a good many of those responsible for the medical curriculum was whether it would be possible in that curriculum to give a greater bias towards social medicine. A considerable alteration in the student's outlook had taken place in recent years. He had just completed examining for the hygiene part of the London M.B. There were whole groups of students who could talk to their examiners in much the same way as Dr. Goodman and Miss Morris had talked that afternoon. He himself never asked a student anything that a general practitioner was not supposed to know; he asked him the sort of questions that the two openers had been raising, and quite a number of the students were well informed and genuinely interested. Many had said that there was a great deal in the D.P.H. curriculum which they should have been taught as medical students. The teaching did not require anything new, but the better utilization of what was already existing in any teaching hospital. He had looked forward to the possibility of a department of social medicine being started in the teaching schools. He did not know whether almoners might be placed under a medical man who was professor of social medicine. He would make every group of students, after their anatomy and physiology, and before they started clinical medicine, receive a short course of instruction in social medicine. In that course they ought to see some of the places where poor people lived and where they worked, and acquire a reasonable understanding of what they earned and what they paid in rent, also a knowledge of medical organizations available. All this ought to be done before the students went into the wards, because once they got into the wards they were taught from the consultants' point of view—that is to say, the point of view of persons cut off to some extent from the type of social medicine under discussion. It was not a question of filling a gap in the student's instruction, but of giving a twist to it, and he believed the best way was to create a department of social medicine in one of the large medical schools.

Dr. L. G. GLOVER thought it important that the embryo doctor who was going into general practice should have the opportunity at the teaching hospital of hearing from the lips of some experienced general practitioner about these matters. Dr. TREVOR EVANS suggested that it should be possible for students, particularly in large towns, to attend at the town hall and see public health in operation, visiting the local tuberculosis dispensary, the infant welfare clinic, and such departments. Dr. G. C. TROTTER mentioned the pioneer dispensary work of Sir Robert Philip in Edinburgh, and added that he himself in Paisley in 1909, before dispensary treatment or national health insurance had begun, started a system of home visitation, and results were obtained even without the aid of the sanatorium.

Dr. ALISON GLOVER mentioned the fact that his father, in the 'eighties, wrote a rather memorable series of articles in the *Lancet* on gaps in medical education, and the result was the addition of a fifth year to the curriculum! He wondered whether the point had been decided, in the minds of those putting forward these proposals, as to the allocation of this work to the undergraduate or the postgraduate years. In his own special branch of medicine, among school children, he had been particularly impressed by the social factors influencing nutrition, for example, and the incidence of rheumatism.

DIAGNOSIS AND TREATMENT OF ANAEMIAS

At the last meeting of the Manchester Medical Society Drs. J. F. WILKINSON and M. C. G. ISRAËLS read papers on recent advances in the diagnosis and treatment of anaemia.

Dr. Israëls said that diagnosis depended upon clinical examination and laboratory tests. To combine the two to the best advantage an orderly scheme was essential, and diagnosis should always precede treatment. The following order of investigation was suggested: (1) full blood count; (2) response to treatment; (3) sternal puncture; (4) daily reticulocyte count; (5) daily platelet count. A full blood count was diagnostic in typical leukaemias, agranulocytosis, and possibly glandular fever. Testing the response to treatment was only justified at the proposed stage in (*a*) women with hypochromic anaemia in whom malignancy had been excluded, and (*b*) cases of pernicious anaemia in which the clinical picture was typical and achlorhydria present. Sternal puncture was diagnostic in the leukaemias, and in such conditions as pernicious anaemia, achrestic anaemia, and pernicious anaemia of pregnancy. Normoblastic marrows were indicative of response to loss of blood or lack of iron without giving any clue to the cause. In pernicious anaemia liver therapy quickly changed a megaloblastic to a normoblastic marrow—therefore liver should not be given until the diagnosis was settled. The reticulocyte count was raised in acholuric jaundice and other haemolytic anaemias. The platelet count was reduced in thrombocytopenic purpura and also in acute leukaemia and aplastic anaemia.

Dr. Wilkinson emphasized the importance of establishing a diagnosis before starting treatment. In treating acute and chronic haemorrhage it was important to combat the shock associated with diminished blood volume. The haemolytic anaemias, apart from those due to toxic drugs and poisons, usually responded well to splenectomy. The treatment of agranulocytosis should be prompt, and large doses of pentose nucleotide be given. Blood transfusion was sometimes necessary, and drugs that might cause the condition—such as the sulphonamides, barbiturates, amidopyrine—discontinued.

SURGICAL TECHNIQUE FOR COLONIC CANCER

At the last meeting of the Section of Surgery of the Royal Academy of Medicine in Ireland, with the president, Mr. W. DOOLIN, in the chair, Mr. SETON PRINGLE opened a discussion on cancer of the colon.

Confining himself to technique, he stressed the importance of the presence or absence of obstruction and the site of the growth in deciding what operative measures were best. He emphasized the necessity for efficient drainage of the proximal bowel in cases in which, before the onset of gross obstruction, there was considerable inflammatory induration for some distance above the growth, but did not advocate the performance of a blind caecostomy except in most extreme cases. He did not approve of a caecostomy for obstruction in the lower pelvic colon. Mr. Pringle then described a modification of the Paul-Mikulicz operation which he had found useful. He advocated the suturing of the parietal peritoneum alone to the "double-barrelled" colon as it emerged from the abdominal wall and also the employment of vaselin gauze wrapped round the bowel external to the peritoneum in order to prevent adhesion between the emerging bowel and the abdominal wall. As a result of such a procedure, about a week after operation the two openings into the bowel could be seen at the bottom of a conical granulating wound deep to all layers of the abdominal wall, but still extraperitoneal. This greatly facilitated the restoration of the continuity of the bowel.

Mr. Pringle then gave an account of a method of anastomosis for certain cases of growths in the lower pelvic colon in patients who would otherwise have to endure a permanent colostomy. After mobilization and excision of the growth, both ends of the bowel were closed by purse-string sutures and the lower (the rectal stump) buried by a second layer. The purse-string suture controlling the upper segment was left long, and a bulldog clip was attached to the end. The rectum was then plugged with gauze soaked in flavine. A second incision was made through the anterior wall of the rectum; the gauze was picked up in a bulldog clip; the assistant withdrew the gauze per anum, bringing down with it the suture and the attached upper segment of the bowel, thus invaginating the closed end of the pelvic colon into the rectum. A few sutures secured the bowel in that position. A week or so later the ligature

came away and the lumen of the bowel was restored. The preliminary colostomy could be closed at a later date. He claimed that this method allowed anastomosis to be carried out deep in the pelvis without risk of sepsis, the mucous membrane of neither colon nor rectum being handled even with a forceps and there being no faecal flow over the line of anastomosis until healing was well advanced. Such a procedure enabled certain growths in the lower pelvic colon to be dealt with without sacrificing the sphincters.

Mr. H. MEADE did not care for the Mikulicz operation. In his opinion eventual cure by it was impossible, as the glands could not be effectually removed. Mr. H. STOKES referred to the danger of giving barium by mouth and by enema for diagnosis of carcinoma of the colon, as obstruction might be caused. Mr. A. CHANCE was in favour of the Mikulicz operation. Mr. J. J. FITZSIMONS considered that the Mikulicz operation as performed nowadays gave a much better chance of removing the glands than the older operation. Professor J. K. JAMIESON thought it would be interesting to know why the growth in intestines was so often angular. Mr. A. L. BUTLER thought the prognosis for cancer of the left side was worse than that of the right side.

Correspondence

Treatment of Gas Gangrene with Sulphapyridine

SIR,—During the past few days I have been engaged in dealing with wounded officers and men from the Western Front, several of whom developed gas gangrene. I write this note to place on record the excellent results obtainable with sulphapyridine (M & B 693). As soon as oedema and cellulitis are clinically evident the patient receives an immediate intravenous injection of sulphapyridine in soluble form, the usual dose being 3 c.cm.—that is, 1 gramme—in 17 c.cm. of saline solution. This is followed by two tablets of sulphapyridine four-hourly for twenty-four hours, after which the dose is gradually diminished. In addition, surgical measures are instituted without delay in order to remove any foreign body or loose pieces of bone and to procure efficient drainage. So far, in all cases the condition of the patients rapidly improved, and the pulse and temperature speedily approximated to normal. During the last war I should have dealt with similar wounds by extensive incisions, or, in some cases, even considered amputation.

The presence of gas-forming organisms was in some cases suspected on account of the mousy odour or the appearance of the wound, but in the majority the presence of gas was first revealed by *x* rays, and therefore treatment was begun in the early stages. Probably patients who are more severely infected should receive massive doses of sulphapyridine on lines similar to cases of pneumococcal meningitis referred to in the *British Medical Journal* of May 18 (p. 804).

It may be mentioned as a point of practical interest that fragments of high-explosive shell possess a far greater penetrative power than during the last war, due to the improvement (!) in explosives. Pieces smaller than a split pea, which previously would hardly have penetrated the deep fascia, are now capable of chipping fragments off the long bones or comminuting the mandible.—I am, etc.,

London, May 27. R. J. MCNEILL LOVE, M.S., F.R.C.S.

Organization of Emergency Blood Transfusion Services

SIR,—Is it not time that some serious consideration were given to the subject of the organization and co-ordination of emergency blood transfusion services throughout the country?

Long before the outbreak of hostilities individuals both lay and medical in various parts of the country had foreseen the need for blood transfusion services which would arise if this country were subjected to heavy bombing from the air. Some weeks before the declaration of war wide-spread attention was semi-officially drawn to the subject through the B.B.C. and in other ways. At the same time numbers of persons connected with existing blood transfusion services and in most instances attached to voluntary hospitals received intimations through local representatives of the Ministry of Health that they should do something in the matter—just what was not indicated.

For the London area a comprehensive emergency blood transfusion service was at once organized, and has since been functioning in a highly efficient manner. Its organization was carried out, and it is now maintained by a personnel subsidized from the public funds. In no other part of the country has such assistance for emergency blood transfusion services been made available. The Minister of Health on July 20 last stated in the House of Commons in reply to a question by Mr. Geoffrey Mander that outside the London area recognition would only be given to certain large areas, and that this would apply only to "the testing and registering" of donors. Only an almost imperceptible minimum of assistance even in this direction has so far been forthcoming.

The organization of a blood transfusion service demands more than the mere testing and registration of donors. It demands the services of personnel to collect the donors when required and to withdraw the blood; further, it calls for the provision of suitable receptacles and storage places for the blood so withdrawn and the means of its distribution as required. The advantages of standardization in all these measures are obvious; no attempt at such standardization on a national scale exists.

It is difficult to understand why the Ministry of Health, while recognizing the claims of the London area to a full service, should withhold it from the rest of the country. Is it too much to hope that, in view of the imminent danger now threatening, the Ministry will be induced to take some steps towards the co-ordination and standardization of existing blood transfusion services, and, further, to extend to the provinces assistance comparable to that given in the London area?—I am, etc.,

S. C. DYKE,
Director, Wolverhampton and District Emergency Blood Transfusion Service.

Wolverhampton, May 27.

Visor for Prevention of War Blindness

SIR,—The description of the visor by Sir Richard Cruise (May 18, p. 825) stresses the importance of prevention as far as possible of eye injuries.

There is a striking difference in protection between the British steel helmet and that of the German, the latter covering the temples and sides of skull. In addition to a visor it would appear that some other pattern of steel helmet is urgent. Only recently a case of total blindness was seen in an otherwise fit soldier, due to a penetrating injury at the temple passing transversely and severing both optic nerves.—I am, etc.,

Worthing, May 23. J. K. RAYMOND.

Treatment of Shock in War Surgery

SIR,—Since the war started two very excellent books have been published which are likely to become textbooks on war surgery and organization. They are *War Wounds and Air Raid Casualties*, a collection of articles by leaders of the profession in England, reprinted from the *British Medical Journal*, and *War and the Doctor*, a collection of articles by leaders of the profession in Scotland.

On page 119 of the former book it is stated by Mr. Gordon-Taylor in writing on transfusion, "I was never convinced of the utility of salines and bicarbonate of sodium in warfare, while the employment of gum acacia must have cost many lives. Fortunately the work of Stuttiford of New York has severely discredited this preparation, and it has now doubtless got its *coup de grâce*." In the latter book Sir John Fraser, Regius Professor of Clinical Surgery, Edinburgh, on page 34 says: "I suggest every centre designed for treatment of shock

should be provided with a sufficiency of flasks of 6 per cent. gum arabic solution with attachments necessary for its intravenous transfusion."

Which of these great authorities are we to follow? Is not gum saline still used in many London and provincial hospitals for shock in civil surgical practice?—I am, etc.,

Bishop's Stortford, May 23. G. T. BIRDWOOD, M.D.

A First-aid Stretcher-carrier

SIR,—A very light and cheap stretcher trolley to save labour, to utilize women for stretcher work, or as a supplement to ambulances can be made as follows:

Take the rear triangles of two bicycle frames with wheels but with pedals removed and the rest of the frame cut off. Place these frames with the single "down" tubes horizontal and parallel. Unite the "bottom brackets" and the saddle sockets with lengths of tube some 23 inches long. On these the stretcher rests. Two light tubes crossing each other and welded together and, diagonally, to opposite "down"

tubes and forks of either bicycle unit produce the carrier. Additions are projections at each corner or light side rails to position the stretcher; a hinged Y leg so that the carrier will remain upright while loading; and two leather straps.

Rubbish dumps contain thousands of old cycle frames and any welding plant can stick the pieces together. Ours has been made for me by our local garage (Hy. C. Kingcome) entirely out of scrap except the wheels and tyres (about 30s. new). On this stretcher trolley two girls have pushed a 10-stone patient up a quarter of a mile gradient of 1 in 10 without undue fatigue.—I am, etc.,

W. F. BENSTED-SMITH, M.B.

Newton Ferrers, S. Devon, May 23.

War Neurosis

SIR,—Dr. William Brown (May 25, p. 868) sums up with the statement that "every type of psychotherapeutic treatment . . . was effective according to circumstances." It follows that medical officers must, as he suggests, be chosen for their specialized knowledge of the theory and practice of psychotherapy.

Undoubtedly, as Sir Arthur Hurst says (May 18, p. 828), it is possible for persons in a position of authority to obtain results by persuasion in the absence of specialized psychotherapeutic experience. But what of the less simple methods? One hears a great deal of hysteria but nothing of early psychoses. Are these to be diagnosed only when treatment by inexperienced medical officers has failed?

It has been repeatedly stated that there are not enough skilled psychotherapists to go round, and recourse must therefore be had to completely or relatively unskilled officers. Is there any evidence that all available personnel is being exploited?—I am, etc.,

Norwich, May 25. R. LOUIS ROSE.

Artificial Respiration: Schäfer's Method

SIR,—With regard to correspondence on this question I had a letter from the late Sir Edward Sharpey-Schäfer shortly before he died, pointing out that certain textbooks did not describe his method quite accurately, and that he recommended the procedure as given in the latest (nineteenth) edition of the *Handbook of Instruction* of the Royal Life Saving Society. He sent me a copy of this and emphasized that it is the pressure of the abdominal organs against the diaphragm which is the essential mechanism. I replied that I could not quite understand this mechanism, and wondered if the diaphragm is slack enough for this or whether it is stretched by this pressure, or whether also the compression of the lower part of the thorax slacks off the diaphragm so that it can be pressed up by the abdominal viscera. Unfortunately I did not receive an answer. The subject needs re-examination in conjunction with anatomists, and probably *x* rays may be necessary to elucidate the complete mechanism.—I am, etc.,

London, N.W.3, May 24. J. ARGYLL CAMPBELL.

Treatment of Syphilis

SIR,—As Surgeon Lieutenant-Commander S. J. Wheeler's quotation of a recommendation of the Committee of Experts on Syphilis and Cognate Subjects on the treatment of syphilis (May 25, p. 871) might perhaps be misunderstood, may I beg your hospitality for the following explanation (see Part II of the original report in League of Nations *Quarterly Bulletin of the Health Organization*, 1935, **4**, p. 239).

The committee put forward two alternative plans of treatment for early syphilis—namely, intermittent and alternating continuous. In the former the unit course for male adults consists of eight injections of an arsphenamine compound, totalling 4.8 to 6 grammes "914," or equivalent in "606," and ten of a bismuth one, totalling 2 to 2.4 grammes bismuth metal, the two types of remedy to be given concurrently, and the interval between any two courses to be of three to five weeks.

As regards the number of courses to be given in this plan the committee said:

> "It is recommended that: (*a*) In cases which remain or become serologically negative during, or by the end of, the first course, four such courses be administered, with intervals of three to five weeks between any two courses. (*b*) In cases which have not become sero-negative by the end of the first course, in addition to the amount of treatment shown in (*a*), further courses should be administered until the patient has received as a minimum three beyond that which has ended with negative serum reactions. At the option of the individual clinician this treatment may be prolonged as may be considered necessary. (*c*) Cases representing signs of clinical relapse of an early type should be dealt with on principles similar to those enunciated in (*b*)."

In the "plan of alternating-continuous treatment for early syphilis" five courses of an arsphenamine compound were recommended, the first containing ten doses of "606," totalling 2.9 grammes to 3.8 grammes "606," or ten to twelve doses of 0.6 to 0.75 gramme "914," and each of the others six doses of "606," totalling 2.4 grammes. The intervals recommended between arsphenamine courses are successively four, six, eight, and ten weeks, and during each of them, as well as for nine weeks after the last arsenical course, bismuth injections or mercurial inunctions are to be given.

I have been unable to trace any final recommendation in the exact words quoted by Surgeon Lieutenant-Commander Wheeler, but the last paragraph of the "Recommendations" in the original report runs as follows: "In cases of primary syphilis which have remained sero-negative throughout, a minimum of five courses of '606' or '914' should be given. Cases of sero-positive primary syphilis should receive the full treatment called for by this system." As the context shows, this paragraph applies only to the "plan of alternating-continuous treatment."

If the two plans are examined closely it will be seen that, broadly speaking, the intermittent plan provides for a minimum of 19.2 grammes "914" and 8 grammes bismuth metal in approximately fifty-two weeks, and the alternating plan approximately an equivalent amount of an arsphenamine compound but rather less bismuth metal in sixty-nine weeks.—I am, etc.,

London, S.W.1, May 25. L. W. HARRISON.

SIR,—There is much truth in the letter of Surgeon Lieutenant-Commander S. J. Wheeler (May 25, p. 871). In the Army we have a "standard" method of treatment of early syphilis which follows closely the recommendations of the committee of experts of the League of Nations Health Organization. A course extending over sixty-one days consists of 5.85 grammes of neoarsphenamine and 2.5 grammes of bismuth metal; unless there are definite contraindications no case receives fewer than four such courses, and the intervals between courses are four weeks at first and five later. Treatment is in the hands of medical officers of wide experience; accurate records are kept and carefully scrutinized.—I am, etc.,

T. E. OSMOND,
Lieutenant-Colonel R.A.M.C.

War Office, S.W.1, May 25.

SIR,—May I be permitted to comment upon the letter of Surgeon Lieutenant-Commander S. J. Wheeler (May 25, p. 871). He recommends that the experts should "decide upon *one* scheme of treatment"; and he states that such a scheme is already to hand and that the "international experts have recommended such a course in the *Quarterly Bulletin of the Health Organization* of the League of Nations" (1935, **4**, 112). If he will again consult that report he will find that the experts formulated *two* different treatment schedules: (1) concurrent-intermittent and (2) alternating-continuous.

In my letter in the *British Medical Journal* of November 4, 1939 (p. 928), and in a subsequent article in the *Lancet* of November 18, 1939 (p. 1082)—which have given rise to this correspondence—I pointed out that, while I was in normal circumstances an adherent of the alternating-continuous method, I considered that in the special circumstances (treatment in the field) the concurrent-intermittent scheme was the more suitable. I can hardly think that Lieutenant-Commander Wheeler will disagree with the committee of experts in their view that *both* of the schedules they recommended constitute adequate treatment for the acute stage of syphilis.

If Lieutenant-Commander Wheeler will compare the schedule I suggested in my letter of November 4, 1939, with the concurrent-intermittent schedule recommended by the committee of experts he will see that the unit-courses in each are practically identical, with this difference: that in mine the arsphenamine dosage is higher—8 grammes as against 6. Again, I recommended that for all degrees of acute syphilis—from the sero-negative primary to the late secondary phase—treatment should extend over fifty-five weeks.

The League of Nations committee recommended that: "(*a*) In cases which remain or become serologically negative during, or by the end of, the first course, four such courses be administered, with intervals of three to five weeks between any two courses." That would occupy fifty-two weeks. The experts also recommended that: "(*b*) In cases which have not become sero-negative by the end of the first course, in addition to the amount of treatment shown in (*a*), further courses should be administered until the patient has received as a minimum three beyond that which has ended with negative serum reactions. At the option of the individual clinician, this treatment may be prolonged as may be considered necessary. The clinician may consider it advisable before suspending treatment to have the cerebrospinal fluid examined."

Now it must be perfectly plain that the schedule I recommended in my letter and article is based upon that of the League of Nations committee, and that, if anything, it is more intensive. I do not know if Lieutenant-Commander Wheeler is familiar with my method of evaluating anti-syphilitic therapy; if he is not, he will find it fully described in my forthcoming book *Venereal Diseases* (H. K. Lewis and Co., Ltd.); but the schedule I suggest gives an efficiency index of 116.3, and the alternating-continuous one recommended by the League of Nations committee gives one of approximately 88.9. An investigation of this method of assessing anti-syphilitic therapy carried out upon many thousands of male patients during the past nineteen years has shown conclusively that a cure rate of 100 per cent. is invariably obtained where the efficiency index is not less than 60. All the schedules mentioned in the previous correspondence—those of Dr. C. Hamilton Wilkie (November 11, 1939, p. 974); of Mr. R. C. L. Batchelor and Dr. Robert Lees (November 18, 1939, p. 1017); and of Dr. A. O. F. Ross (November 18, 1939, p. 1018)—have efficiency indices of well over 60.

Lieutenant-Commander Wheeler writes: "Taken as a whole, the letters illustrate the chaotic state of the treatment of syphilis in the United Kingdom." The truth is that the letters show the very reverse. They are all in complete agreement—whether or not their writers approve of my method of evaluating therapy—in the one important thing—namely, that *adequate treatment is secured when an efficiency index of 60 or over is reached.* Lieutenant-Commander Wheeler states: "It is not helpful for Dr. Ross to say that he has 100 per cent. cure after three unit courses spaced at staggering intervals, or for Lieutenant-Colonel Burke to say that a scheme of treatment which has 'an efficiency index of 100' must (!) produce a cure rate of 100 per cent." I submit that such statements by Dr. Ross, Mr. Batchelor and Dr. Lees, and myself are extremely helpful. Very many of the cases upon which we base our views—views which we express with confidence and authority—have been followed up and thoroughly investigated over a period embracing the "incubation periods of tabes, general paralysis, and syphilitic arteritis."

Doubtless Dr. Ross will answer for himself; but I must say that I completely fail to see how Lieutenant-Commander Wheeler can think that Dr. Ross's letter "surely carries with it a very sinister implication—namely, that the reversal of the Wassermann is a criterion of cure." An experienced syphilologist—and I emphasize the word "experienced"—such as Dr. Ross does not require to have quoted to him the very true words of Moore. Strange though it may seem to Lieutenant-Commander Wheeler, all the venereologists who have taken part in this correspondence have for a great many years, even long before 1929, realized and acted upon the fact that, as Moore says, "the obtaining of a negative Wassermann reaction in early syphilis has nothing whatever to do with ultimate 'cure,' and that to stop or interrupt treatment at this point exposes the patient to a very grave danger of subsequent and possibly disastrous relapse."—I am, etc.,

L.C.C. Whitechapel Clinic, London, E.1, May 27. E. T. BURKE.

Kidneys and Sex Hormones

SIR,—In your issue of April 20 (p. 645) you published an article on kidneys and sex hormones by V. Korenchevsky and M. A. Ross. In this paper the authors make no reference whatsoever to many of the previous papers on the subject—notably those of Dr. Hans Selye of this Department, who had previously published accounts of experiments which revealed the facts to which these authors now draw attention and several others of which they make no mention. In all of Korenchevsky's previous papers on the subject the weight changes in the kidneys produced by androgens were minute and no more marked than those produced in most other organs, so that he failed to attach any particular importance to them. This is probably due to the fact that he invariably used the rat, which is relatively unsuitable for such investigations. This is also probably the reason why in his present communication he noted no significant action of androgens in normal males.

Selye showed previously that the mouse is much more suitable for such investigations, and using this test object he was able to show that androgens enlarge the kidneys both in normal and in castrate animals of both sexes, and he gave a detailed histological description of the changes induced by

such hormones, especially in Bowman's capsules. Furthermore, he found that there is a definite sex difference in Bowman's capsules in the mouse, which disappears after castration, and that the male hormone restores this structure to the male type. Not only did Selye point out before Korenchevsky that this action of androgens may be of clinical significance, but, unsatisfied with such purely speculative statements, he proved that in animal experiments the kidney-damaging action of certain poisons such as sublimate is greatly inhibited by androgens—a fact which may be of interest to your clinical readers. He noted further that in addition to the androgens, pregnane derivatives such as progesterone and desoxycorticosterone exert a similar nephrotrophic action. This is rather significant in view of the fact that the androstane derivatives, as Korenchevsky points out himself, have the disadvantage of being strongly androgenic, which is a great drawback if they are to be used for the cure of kidney disease. The action of oestrogens on the kidney has also been studied histologically by Selye, who described degenerative lesions similar to those mentioned in Korenchevsky's recent paper.

The authors of the article in your *Journal* make no reference to all these previous publications. Possibly war conditions have made it difficult for workers in London to obtain some of the oversea journals, but as a matter of record I would like to draw attention to the fact that other workers have previously published these and other conclusions. I would particularly like to mention the following papers:

Selye, Hans: On the toxicity of oestrogens, with special reference to diethylstilboestrol. *Canad. med. Ass. J.*, 1939, **41**, 48.
Selye, Hans: The effect of testosterone on the kidney. *J. Urol.*, 1939, **42**, 637.
Selye, Hans: On the protective action of testosterone against the kidney-damaging effect of sublimate. *Canad. med. Ass. J.*, 1940, **42**, 173.
Selye, Hans: The effect of testosterone on the kidney and on the general condition of uraemic animals. *Proc. Canad. physiol. Soc.*, November 3 and 4, 1939; *Canad. med. Ass. J.*, 1940, **42**, 188.
Selye, Hans: Post-natal masculinization of the female rat by means of testosterone propionate. *Anat. Rec.*, 1940, **76**, Suppl. 2, 145.
Selye, Hans: On the protective action of testosterone against the kidney-damaging effect of sublimate. *J. Pharmacol.*, 1940, **68**, 454.

—I am, etc.,

Department of Anatomy, McGill University, Montreal, May 6. C. P. MARTIN.

Treatment of Pneumococcal Meningitis with Sulphapyridine

SIR,—The article by Dr. Stephen Falla (May 18, p. 804) prompted me to record a case I had recently.

At 7 a.m. on February 5, 1940, I was called to see a child aged 2¼ years who, when I arrived, was in a convulsion, from which it soon recovered. The temperature was 101° F. and the pulse fast, but there were no other signs to account for the convulsion. The next day the child had two more convulsions, but still I could not discover a cause. On the third day no more convulsions occurred, the temperature was 104° F., obvious signs of cerebral irritation were present, the abdominal reflex was absent, and slight retraction of the head, ptosis of the right eyelid, and divergent strabismus of the right eye were noted. I did a lumbar puncture. The cerebrospinal fluid was turbid and under marked pressure. The following is the pathological report: The fluid is very turbid, and contains a large amount of pus: polymorphs 90 per cent., a few lymphocytes, Gram films show pneumococci; *p*H 7.4; protein 150, chlorides 720, sugar 65, urea 22 mg. per 100 c.cm.; globulin, negative quantity; Lange's curve, 0012230000; T.B., none found; cultures, colonies of pneumococcus.

I started the child on sulphapyridine on the third day, giving him one-gramme doses orally every six hours (that is, four grammes per twenty-four hours). This treatment was continued for three days, though on the second day of treatment the signs of irritation were gone and the temperature normal; no retraction of the head was noted, but the ptosis and strabismus were marked. After three days the dose was reduced to half a gramme every six hours for a further three days, and then to a quarter of a gramme for two more days, when the medication was discontinued.

The child made an uneventful recovery, except that the strabismus continued until recently; and in fact there is a suggestion of it now if the eye is tired; otherwise the child is in good health and appears mentally normal for a child of its years.

I am indebted to Mr. H. S. Websdale of the Pathological Department of the Pembroke County War Memorial Hospital for his report on the cerebrospinal fluid.—I am, etc.,

Neyland, Pembrokeshire, May 18. J. A. K. DOUGLAS.

Synthetic Radio-elements

SIR,—It is well known that some of the lighter chemical elements, such as sodium and potassium, are faintly radio-active, though only to the extent of a millionth part of that of radium. Nevertheless the action of potassium on protoplasm is probably not negligible. The Dutch physiologist Zwaardemaker has computed that of the forty grammes of potassium that enter into the make-up of an average human adult 80,000 atoms are discharging a similar number of high-velocity electrons into the tissues every second. He believes—on somewhat slender evidence, it is true—that the energy of these electrons sensitizes synaptic nerve-junctions in a way that determines the direction of flow of nervous impulses subserving sensation, volition, and thought.

Exposure to ordinary light—that is, to the impact of medium-energy photons—increases the normal radio-activity of potassium and sodium. More profound are the changes effected in these elements by the action of high-energy ultra-violet photons and ultra-atomic constituents such as electrons, protons, deuterons, and alpha particles. In the following examples elements present in bone have been specially chosen for reasons which will later on be apparent; in each case the upper figures indicate atomic weight, the lower ones the atomic number. Normal nitrogen, $^{14}_{7}N$, as well as normal oxygen, $^{16}_{8}O$, when subjected to bombardment by neutrons, $^{1}_{0}n$ (proton-electron compacts), transmutes to a radio-active type of carbon, $^{14}_{6}C$ (normal carbon, $^{12}_{6}C$). Another variety of radio-carbon, $^{13}_{6}C$, appears when beryllium, $^{9}_{4}Be$, is acted on by alpha particles or helium nuclei, $^{4}_{2}He$. These same particles, if made to act on boron, $^{10}_{5}B$, give rise to radio-active nitrogen, $^{13}_{7}N$. Conversely, fluorine, $^{19}_{9}F$, if bombarded with neutrons, transmutes to yet another kind of radio-nitrogen, $^{16}_{7}N$, which in its turn becomes radio-active oxygen, $^{19}_{8}O$. Normal fluorine if acted on by deuterons (the nuclei of heavy hydrogen, $^{2}_{1}H$) becomes radio-active, taking the form of $^{20}_{9}F$, and the latter, shedding an electron ($^{0}_{-1}e$), is converted into neon, $^{20}_{10}Ne$, the inert gas used in advertisement displays. Yet another radio-fluorine, $^{17}_{9}F$, by emitting a positron or positive electron ($^{0}_{+1}p$), transmutes to radio-oxygen, $^{17}_{8}O$. The cardinal element of bone—calcium, $^{40}_{20}Ca$—happens to be a disintegration-product of radio-potassium, $^{40}_{19}K$. Another important bone element, phosphorus, $^{31}_{15}P$, becomes radio-phosphorus, $^{32}_{15}P$, when subjected to bombardment by deuterons. Magnesium, $^{24}_{12}Mg$, to take a third important bone element, behaves according to the nature of the projectile impinging on its nucleus: when this is an alpha particle the resulting product is a radio-active silicon, $^{28}_{14}Si$; when it is a neutron, $^{1}_{0}n$, the magnesium itself becomes radio-active, $^{27}_{12}Mg$.

Advantage has been taken of synthetic radio-activity to irradiate sodium, $^{23}_{11}Na$, and to use the resulting radio-sodium, $^{24}_{11}Na$, in lieu of the extremely expensive radium, $^{226}_{88}Ra$. Radio-active sodium is produced when the normal element is bombarded with deuterons. Unfortunately, however, whereas radium has a half-life period of about 1,600 years, that of radio-sodium is only about a day.

The materials of the living body have themselves been shown to be radio-active, and their radio-activity would appear to be enhanced by irradiation. In the early days of radium when it was put to the use of making luminous watch-dials

every girl engaged in their manufacture in a Jersey, U.S.A., factory died from the effects of internal radium bombardment. When one considers that even so minute a mass of radium as a millionth of a gramme constitutes a battery incessantly firing 3,000,000 projectiles a minute with a velocity of the order of 75,000 miles a second, the fate of these girls is not to be wondered at. The most extraordinary phenomenon in connexion with their deaths is that for years afterwards the bones appear to have retained radio-activity. Dr. E. E. Free of the faculty of New York University secured a finger-bone of one of the victims long after interment and placed it in front of a Geiger counter. He was thereby able to demonstrate the far-reaching fact that atoms of the bone were still emitting high-velocity particles. Now, as all the elements contained in bone are potentially radio-active and, like sodium, comparatively inexpensive, might not their use in place of radium afford a practical solution of a difficult problem? To such end I suggest that experiments should be carried out to ascertain the relative particle-emitting efficiency, as compared with radio-sodium, of irradiated bone elements—calcium, phosphorus, magnesium, etc.—both separately, and collectively in the form of irradiated bone-dust.—I am, etc.,

CHARLES M. BEADNELL,
Egham, Surrey, May 10. Surgeon Rear-Admiral.

Rubella and the Fourth Disease

SIR,—The condition which for want of a better name has been called the fourth disease—the others being scarlet fever, measles, and rubella—is generally considered by most authorities to be either a rubella with a scarlatiniform rash or a simultaneous infection with both rubella and scarlet fever. Whichever of these be correct, if indeed either be, then with this year's wide-spread epidemic of rubella and the usual sporadic cases of scarlet fever one should have expected reports of such combinations in fairly large numbers. Indeed, these may have occurred, and I write this letter to ask that they should be reported in as full detail as is possible.

The usual description of the condition is that it begins suddenly with a profuse rash which, starting as morbilliform, rapidly assumes the appearance of a severe scarlet fever, but of course retaining its raised character. Fever is usually high—often 104°—and there is enlargement of the post-cervical glands and sometimes of the axillary and inguinal as well. The patients look and feel extremely ill, but complications seem to be rare. The most striking feature, however, is the very complete desquamation, rarely paralleled in the average scarlet fever.—I am, etc.,

London, N.6, May 25. W. LEES TEMPLETON.

Problems of Rubella

SIR,—In reference to the article "Rubella at Sea" (May 25, p. 851), I should be interested to know whether any other similar investigations have been carried out, and whether the numbers mentioned in this article are too small to be of value regarding the epidemics of rubella and "sore throat" which occurred this year.

Particularly am I interested in the following points: (1) Was the rubella atypical in type? (*a*) Its infectivity appeared less than was anticipated (presumably there was not a high incidence of immune ratings). (*b*) Indirect infection is not usual in rubella. (*c*) The incubation period of the one known case was only nine days—that is, shorter than the usual time. (*d*) Are not the "red spots" on the hard and soft palate atypical? (2) Despite the conclusions in the article, perhaps there are a few slender points in favour of a relationship between the rubella and "sore throat": (*a*) Apparently no rating who developed the "acute cold" or "sore throat" subsequently developed rubella, and vice versa. (*b*) The average duration of the illness was the same in both diseases—namely, six days. (*c*) One of the few complications of rubella is recurrent sore throat.

To further this one would need to know whether any of those who developed the sore throat had ever had rubella. If so, then may they not be showing a manifestation of a second infection in the form of recurrent sore throat? If not so, then may not the rubella virus be affecting different people in different ways? Once again, assuming a relationship between the diseases: if (and the article does not say) the sore throats began before the rubella, then the indirect method of infection would be discredited.

As a student I write with all humility, and as I have not the facilities for any such investigation I should be grateful to hear of any other work carried out on the recent epidemic which would clear up my difficulties.—I am, etc.,

Medical School, Leeds, May 25. R. P. MATTOCK.

The Services

CASUALTIES IN THE MEDICAL SERVICES

ROYAL ARMY MEDICAL CORPS

In Casualty List No. 4, issued by the Army Council, the names of Major-General George Grant Tabuteau, D.S.O., Major Kenneth Vyvian Milburn, Lieutenant William Edward Pennington, and Lieutenant Edward George Reynolds are posted under the heading "Died." Obituary notices of Major-General Tabuteau and Lieutenant Reynolds were published in the *Journal* of April 6 (p. 595) and March 23 (p. 510) respectively.

Major KENNETH VYVIAN MILBURN was educated at the University of Durham, where he graduated M.B., B.S. in 1924, also taking the M.R.C.S., L.R.C.P. in the same year. He proceeded M.D. (with high commendation) in 1927. He had held the posts of resident medical officer at the Princess Mary Maternity Hospital and house-surgeon to the gynaecological department of the Royal Victoria Infirmary, Newcastle-upon-Tyne, obstetric surgeon to the Borough Maternity Home, Sunderland, and was assistant honorary physician to the infirmary and to the Children's Hospital, Sunderland. He served in the war of 1914–18, receiving the medals, and had held the rank of captain in the Northumbrian Brigade, R.A., T.A., since March 18, 1935, being promoted to major at the beginning of the present war. He joined the British Medical Association in 1924, and was also a member of the Newcastle and Northern Counties Medical Society.

Lieutenant WILLIAM EDWARD PENNINGTON was educated at Liverpool, and took the L.M.S.S.A. in 1924. He was in practice at Ellesmere Port, Cheshire, and joined the Royal Army Medical Corps at the beginning of the present war.

The list also includes the names of Lieutenant James Ian McConnell as "Missing, Believed Prisoner of War," and Lieutenants George McLean Gorrie and Graves Ernest Stoker as "Prisoners of War."

Universities and Colleges

UNIVERSITY OF CAMBRIDGE

J. S. Richardson and A. G. V. Aldridge have been approved by the M.D. Committee for the degree of Doctor of Medicine in absence.

The managers of the Frank Edward Elmore Fund have elected J. S. Mitchell, Ph.D., M.B., B.Ch., of St. John's College, to an Elmore medical research studentship from July 1, 1940.

At a Congregation on May 25 the following medical degrees were conferred:

M.D.—O. A. Trowell, W. T. Cooke.
M.B., B.CH.—R. H. Taylor.

UNIVERSITY OF DURHAM

The honorary degree of D.C.L. is to be conferred upon Mr. Hugh Lett, President of the Royal College of Surgeons of England, at a Congregation to be held in June.

SOCIETY OF APOTHECARIES OF LONDON

The following candidates have satisfied the examiners at the examination indicated:

MASTERY OF MIDWIFERY.—Margaret Venters, M.B., Ch.B., M.R.C.O.G., S. H. Waddy, F.R.F.P.S.

Obituary

HERBERT J. PATERSON, M.CH., F.R.C.S.

Emeritus Surgeon, National Temperance Hospital

We regret to record the death of Mr. Herbert John Paterson, C.B.E., which took place at Glasgow on May 21. Mr. Paterson was a London consulting surgeon of very high reputation, his particular interest being in cancer and diseases of the stomach, and for many years he was senior surgeon, and at the time of his death emeritus surgeon, at the National Temperance Hospital in Hampstead Road. He was born in 1868, the son of an Argyllshire medical man. He entered Trinity College, Cambridge, where he was Foundation Exhibitioner, and in 1890 he was senior entrance scholar in natural science at St. Bartholomew's. He qualified in 1893, and at once devoted himself to surgery, taking the F.R.C.S. in 1897. Much later in life, in 1925, he proceeded to the M.D. of his old university, having taken the M.Ch. degree in 1910. He gained the Jacksonian prize of the Royal College of Surgeons in 1904 for an essay on the treatment of such infections of the stomach as are amenable to direct surgical intervention, and two years later he was Hunterian professor of surgery at the College. He was examiner in surgery to the Universities of Glasgow and Cambridge, consulting surgeon to the Ministry of Pensions Hospital, and during the last war was honorary surgeon in charge of Queen Alexandra's Hospital for Officers, and for long afterwards surgeon to King Edward VII Hospital for Officers. Other activities included the honorary medical secretaryship of the Royal British Nurses Association, and he put in a long period of service on behalf of the Fellowship of Medicine, at first as honorary secretary and later as chairman of the executive committee, his interest in postgraduate education dating back to long before the establishment of the Hammersmith school.

Herbert Paterson employed a busy pen. His debut in medical literature was the editing and largely the rewriting of Walsham's *Handbook of Surgical Pathology* in 1904. Shortly afterwards his Hunterian Lectures to the Royal College of Surgeons were published, the subject being gastric surgery. In 1925 he edited a number of postgraduate lectures on cancer, delivered under the auspices of the Fellowship of Medicine, and in 1929 he produced a valuable clinical handbook for practitioners entitled *Indigestion: Its Differential Diagnosis and Treatment*.

Although the whole bent of his career was towards surgery he fulfilled the definition of a surgeon as a physician who practised with his hands, for he never allowed any bias of surgical outlook to interfere with his judgment of a case, and over and over again he would insist on a fair trial of medical measures before surgery was contemplated. He was a man of pleasing personality, cultured mind, and modest manner, and although he had been living at Berkhamsted for some time his passing will evoke a sharp regret in many circles, especially at the hospital in the Hampstead Road with which he was for so long identified. He was a member of the British Medical Association for many years until his retirement from active practice.

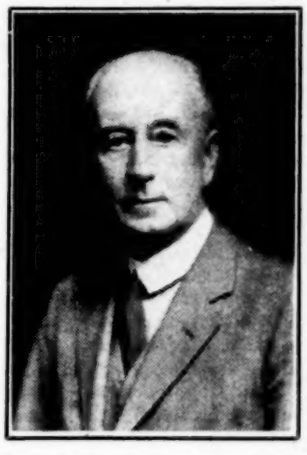
[The photograph reproduced is by Elliott and Fry, Ltd.]

A. GARDNER ROBB, M.D., D.P.H.

Medical Superintendent, Belfast City Fever Hospital

The death of Dr. Alexander Gardner Robb on May 6 removes one of the most loved and highly esteemed members of the Belfast Medical School. His was an outstanding personality, noted for his wisdom, clinical ability, and intelligent guidance in public and private interests.

The eldest son of the Rev. James Gardner Robb, D.D., LL.D., he was born in 1866 at Clogher, Co. Tyrone, where his father was Presbyterian minister. In 1874 the family moved to Toronto, returning to Galway in 1879. Gardner Robb was educated at Galway Grammar School and Queen's College, Belfast, graduating M.B. in the Royal University of Ireland in 1891 and taking the D.P.H. of the Royal College of Surgeons in Ireland in 1902. Immediately after graduating he was appointed resident physician at the Union Fever Hospital, Belfast. There he remained four years, and thither he returned as visiting physician in 1900 after five years as a dispensary doctor in the Springfield district of Belfast. When the Belfast City Fever Hospital at Purdysburn was opened in 1906 he was appointed medical superintendent, and thenceforward devoted himself entirely to the treatment and study of infectious diseases in his two hospitals and a wide practice as a consultant. Dr. Robb was vice-president of the Section of Haematology and Vaccine Therapy at the Annual Meeting of the B.M.A. at Belfast in 1909, and of the Section of Hygiene and Public Health in 1937. He was a representative in 1920 and 1921, and a member of Council 1916–17.



J. A. C. writes:

As doyen of that branch of medicine concerned with the diagnosis and treatment of epidemic diseases, Dr. Gardner Robb's position was unquestioned, and his advice in matters of doubt was accepted as final. It is not so widely known, especially to the younger generation, that he was also regarded as "guide, philosopher, and friend" by many of his colleagues, who sought his advice on a nice question of ethical procedure or medical policy. His power of co-operating with lay boards without arousing friction and with complete success amounted to a gift which always commanded the admiration of his colleagues, and in such matters his sage counsel was often sought and ungrudgingly given. Dr. Robb was born with one qualification which tends to success. He was a son of the Manse, a member of a large family with the necessary incentive to make good by his own efforts. As a boy of 14 he was handicapped by a lack of health sufficient—or so it was supposed—to make it necessary to send him to sea. It is probable that this experience of sailing round the world in one of the famous Belfast sailing clippers created in him that love of the sea which governed his choice of holiday. It may also be credited with such return to health

as enabled him soon after to become a member of the international lacrosse team during the period when that game was popular in Northern Ireland. It may also have contributed to that imperturbability and poise of manner which made him such a charming and restful holiday companion. He was a man of many activities, in all of which he excelled and which he exercised—perhaps too freely—until within a very short time of his death. To die in harness was probably his choice.

J. M. McC. writes:

The death of Dr. Gardner Robb after a short illness is a serious loss to the medical profession in Northern Ireland, where through a long and distinguished professional life he maintained close and friendly relations with his colleagues and passed many generations of medical students through his hands. Early in his medical career he was attracted to the study of fevers, and he became visiting physician to the Belfast Union Fever Hospital. In 1906, when the Corporation of Belfast built the Municipal Fever Hospital at Purdysburn, Gardner Robb was appointed medical superintendent, and in his thirty-three years of devoted work there he guided the hospital to a place in the front rank of public institutions for the treatment of infectious diseases. In his teaching and in research done at Purdysburn, particularly into cerebrospinal fever, he furthered the understanding and treatment of the various febrile diseases. To his ability as a physician was added a kind and quiet manner which endeared him to his patients and inspired their confidence. His fairness and consideration, too, won and held the loyalty of all those who worked under him. He was a past president of the Northern Ireland Branch of the British Medical Association and of the Ulster Medical Society. His early years in Canada had made him a lover of winter sports, and he was a keen golfer and bridge player, and a man of many friends outside as well as inside the medical profession. In conversation he was interesting and amusing, and as a public speaker he held his audience not only by the charm of a pleasant voice and an easy delivery but by the lucid and logical way in which he expressed his views. Gardner Robb combined great skill in clinical medicine and interest in scientific research with the acumen, tact, and determination which go to make a fine administrator. When his friends spoke, as they often did, of his "common sense" they did not refer to mere worldly wisdom but to his sound judgment, his foresight, and his calm but never unhelpful attitude to men and their difficulties. His pupils will remember him with admiration and gratitude, his friends with affection. To those who had the privilege of being both pupils and friends his loss seems irreparable.

F. F. K. writes:

The passing of Dr. A. Gardner Robb has removed one of the most picturesque figures of the Belfast Medical School. As teacher of infectious diseases he came into intimate contact with senior students over many years, and few but must have warmed to that delightful personality. His teaching was of the light, easily assimilable quality, essentially practical and based upon vast clinical experience with a happy rendering of witty anecdote; never a lecture without some spark of personal experience or humour to leaven mere facts. He published articles upon cerebrospinal fever in 1908, acute poliomyelitis in 1915, scarlatina in 1926, and diphtheria in 1937, all of them being masterful expositions of the results of acute clinical judgment. Into administrative spheres he brought a wealth of tact, policy, and quiet discipline. He had that invaluable faculty of getting things done to his liking with a minimum of effort. No more quietly efficient establishment of its kind could be imagined than that over which he presided. The architecture of his hospital was ever a joy and pride to him. But as a physician he was surely to be seen at his best. Nature had endowed him with a charm of manner which was invariably reflected in his dealings with parents or friends of patients. That charm combined with infinite kindness and great skill made him truly a beloved physician. To see him at the bedside of a critically ill patient inspired not only the sufferer but every attendant to extreme efforts. His medical and nursing colleagues were ever taught to consider the personality of patients and attend to the smallest detail. Clinical acumen of his quality to which was added years of shrewdest observation evoked the greatest confidence in his presence. And how warm his praise or kindly his encouragement of those fortunate enough to work under him! What better memorial could any man desire than that his life-work should be continued as he would have guided it? So Purdysburn Fever Hospital will stand as that living memorial to its beloved chief, Alexander Gardner Robb.

F. J. GOMEZ, M.R.C.S.

Past President, West Somerset Branch

Many of those who have been associated with the central work of the British Medical Association, as well as with Association and other activities in the West of England, will learn with regret of the death of Dr. Francis Joseph Gomez, which took place at South Petherton in Somerset on May 16.

Dr. Gomez, who was in his sixty-eighth year, did not often speak in public, but he was an excellent committee man and could always be depended upon for good counsel. For fifteen years he was a member of the Dominions Committee of the Association, where his intimate knowledge of affairs in some parts of the British Empire over-seas was of great assistance in solving many knotty questions respecting which it was not always easy to get information. He assisted particularly on the subcommittee appointed a year or two ago to prepare the evidence to be tendered on behalf of the Association to the Royal Commission visiting the West Indies, and also on the committee set up to deal with the thorny problem of the organization of the medical profession in India. For many recent years his face was one of the most familiar at the Annual Representative Meetings. The first of these which he attended was at Cardiff in 1928, and then in an almost unbroken succession until Plymouth in 1938. He rarely mounted the platform, but in quiet ways he exercised a considerable influence. He was also a member of Council, with a short interval, for ten years from 1924 onwards. The British Medical Association, of which he had become a member in 1902, shortly after his qualification, had no more loyal servant. In local affairs as well as central his services were freely given. He was president of the West Somerset Branch, and nine years after he had passed the chair he became its honorary secretary, continuing as such when in 1931 under a rearrangement the Branch became the Division.

Educated at Queen's College, Port of Spain, Trinidad, Dr. Gomez qualified from King's College, London, in 1900 as M.R.C.S., L.R.C.P. After an assistantship he went to South Petherton, where he remained until his death. He took a keen interest in all matters connected with the profession both locally and centrally, as evidenced by his many appointments. He had been secretary to the Somerset Panel Committee and a member of the Somerset Insurance Committee. During 1914–18 he was a member of the Local Medical War Committee, and again in the present war he was elected a member of the Local War Emergency Committee, and was chairman of the Somerset Emergency Medical Bureau, which deals with the care of the absentee practitioner's interests and the working of the scheme for medical care of the unaccompanied evacuated children. Centrally he had been again elected, only last month, as one of the twenty-two members of Council of the B.M.A. Outside his interests in the medico-political work of the B.M.A. he was a Freemason of the Lodge of St. George, Taunton. He was a representative member of the County Health Insurance Committee on the Somerset Rural Community Council and chairman of the Health Committee of the Council.

Gomez (writes a colleague) was a man who had a wonderfully clear brain for all committee work, and had the great gift of keeping a discussion on its lines and of bringing a committee back to the line if it wandered off it, thus shortening discussion very helpfully. He was able to grasp essential points and was of the greatest help in organizing such schemes as those for absentee practitioners and the care of

evacuated children. Always ready to give valuable advice and help, he will be greatly missed and very hard to replace. He was recognized as the leader of the doctors in the West Somerset area since the death of Dr. J. A. Macdonald. His hobby was gardening, in which he achieved some success in the growing of carnations. He is survived by his widow, a daughter and two sons, to whom we extend deep sympathy.

LOCKHART STEPHENS, C.B.E., D.L

Former Chairman of Portsmouth Division

Dr. Lockhart Edward Walker Stephens of Emsworth in Hampshire, who died on May 18 at the age of 81, was an example of the "good B.M.A. man," the sort of man who could be depended on to work for the profession and the Association, either locally or centrally. It is more than ten years since he was last seen in the council and committee rooms at Tavistock Square, but his bluff country-squire-like figure is not soon forgotten.

He was born in 1858, the son of a doctor, and was educated at Epsom College. He qualified M.R.C.S.Eng. and L.S.A. in 1882, and for many years practised in that interesting part of Southern England overlooked by the spire of Chichester and guarded by the guns of Portsmouth. For as long a period as twenty-seven years he was medical officer of health to the urban district council of Warblington, and after his retirement from that position in 1923 he became a member of the council itself. He was also deputy lieutenant for Hampshire, and during the last war and for some time afterwards he was county director of the British Red Cross Society for Hampshire. On his retirement an illuminated address was presented to him from the medical officers working in the auxiliary hospitals in which the fifty-three signatories recorded their gratification that the post should have been held by a medical man and thanked him for the courtesy and consideration he had shown to his colleagues in every part of the county. They attributed much of the success which the society had attained in Hampshire to his untiring efforts.

Lockhart Stephens's work in executive positions in the British Medical Association began with his appointment as honorary secretary of the Southern Branch from 1922 to 1927, and in 1923–4 he was chairman of the Portsmouth Division. It was in 1923 that the Association held its Annual Meeting at Portsmouth, when he was chairman of the inviting Division and honorary secretary of the Branch. He also served as a representative of his Division, and for four years he was a member of the Central Council, during which time the Charities Committee engaged his principal attention.

W. P. McE. writes:

The death of Dr. Lockhart Stephens has caused deep and wide-spread regret to his fellow townsmen, his patients, and his numerous friends elsewhere, for indeed his geniality and capacity caused him to be greatly respected and esteemed. He was the son of a medical practitioner of high repute practising in Emsworth, was born in that town, and succeeded to his father's practice. Associating himself with the local social activities he formed a miniature rifle club, and owing mainly to his initiative, energy, and influence the Victoria Hospital was founded, which institution at the present time has a building, equipment, and staff of which the town may be proud. Dr. Stephens took a keen interest in the B.M.A. and was in turn treasurer, secretary, and chairman of the Portsmouth Division, president of the Southern Branch, and a member of the council of that body. He was the senior deputy lieutenant for the County of Hants and received the C.B.E. in recognition of his services during the last war.

All sections of the community in Radcliffe are mourning the death of Dr. ISAAC FLACK, J.P., who practised there for thirty years and took a leading part in its public life. Heavy professional work during the recent severe winter, with its epidemic of sickness, and continuous municipal and A.R.P. duties, overtaxed his strength, and a short time ago he went to Ireland in the hope of regaining health. He died at Bangor Hospital, Co. Down, on May 22. Isaac Flack was born at Galway on March 7, 1882, and was educated at Galway, Belfast, and Edinburgh, taking the triple Scottish qualification in 1907. After a short period at Norwich he went to practise at Radcliffe, and during the last war he was in France as temporary captain R.A.M.C. He took the D.P.H. of Manchester in 1918 and served for twelve months as specialist sanitary officer at the Cherbourg base. A few years after returning to civilian life Dr. Flack started on the public career which brought him the highest local honours. In every sphere of communal organization his active interest bore fruit, particularly in education, housing, ambulance work, and public health. As Mayor of Radcliffe during a most difficult period (1938–40) he applied himself to the ever-increasing duties of his office with zeal. In all he had been a member of the Radcliffe Council for sixteen years and was one of the first to be appointed an alderman when the borough received its Charter of Incorporation; he also represented the Whitefield Division on the County Council in 1928–31 and was a member of the Bury and District Joint Hospital Board. Everyone who worked with Dr. Isaac Flack held him in high esteem for his singleness of purpose and devotion to the welfare of his patients and his fellow townsmen. He joined the British Medical Association in 1917 and was chairman of the Bury Division in 1937–8. His son, Dr. I. Harvey Flack, a member of the editorial staff of the *British Medical Journal*, is now serving with a temporary commission in the R.A.M.C.

Medical Notes in Parliament

The Royal Assent was given on May 22 to the Emergency Powers (Defence) Bill, which had passed through both Houses of Parliament on that day. This Act gives power for the making by Order in Council of Defence Regulations making provision for requiring persons to place themselves, their services, and their property at the disposal of His Majesty for securing the public safety, the defence of the Realm, the maintenance of public order, or the efficient prosecution of the war. This Act is not expected to affect the maintenance of private medical practices or of voluntary hospitals.

The Treachery Act and the National Service (Armed Forces) Act received the Royal Assent on May 23.

At a meeting of the Parliamentary Medical Committee on May 28, Dr. Haden Guest reported on his visit to the British Expeditionary Force and his observation of medical and hospital provision for it before the German offensive. Sir Francis Fremantle gave information on the control of the E.M.S. Hospital at Orpington and on discussions about the moral welfare of the troops in France and the avoidance of venereal infection among them. The Committee agreed that entertainments and instructions were the best precautions. The Committee was informed that Mr. Storey proposed on the Workman's Compensation Bill to move an amendment securing payment to hospitals for treatment rendered under the Bill. The committee approved a suggestion that a further amendment should be tabled to secure that a proportion of this compensation would go towards the remuneration of the medical staff.

Tuberculosis

On December 31, 1939, the number of beds reserved for the treatment of tuberculosis in England was 24,606, of which 19,312 were occupied. The corresponding figures for Wales were 1,827 and 1,640. The annual death rate returns for 1939 are not yet available, but the number of beds reserved for the treatment of tuberculosis in England expressed as the number per hundred tuberculosis deaths in 1938 is approximately 102, while for Wales it is 91. Mr. MACDONALD gave these figures

on May 23, in answer to Mr. Gallacher. Dr. SUMMERSKILL suggested that they proved the need for eliminating tuberculous milk. Mr. MACDONALD said the figures indicated the importance of getting ahead with schemes of pasteurization. He would take any action which was practicable under present circumstances.

On the same date Mr. MACDONALD told Mr. Viant that of the deaths registered in England and Wales in 1938, 26,176 were classified as being due to tuberculosis. Of these 4,246 were classified as being due to non-respiratory tuberculosis. These latter deaths would include the majority of the bovine cases.

Notes in Brief

The number of patients on April 30 on the waiting list for admission into institutions and sanatoria of the Welsh National Memorial Association was 333. Twenty-two weeks is the longest time a case has been on the waiting list, and the average period of waiting is ten weeks.

A committee has been set up to investigate the possibility of applying luminous materials for air raid precautions.

Sir John Anderson has invited a British biologist to serve on the Camouflage Committee.

The number of factory inspectors is now 297, which is slightly higher than at the outbreak of war. It is hoped soon to add another ten or twelve.

EPIDEMIOLOGICAL NOTES

Infectious Diseases for the Week

In England and Wales all the important notifiable diseases with the single exception of measles have decreased in incidence during the week.

Measles

Measles has been on the increase in the last few weeks, but only in certain districts, rural and urban, has it attained epidemic proportions. The largest cities have been relatively unaffected, although both Liverpool and Manchester have partly shared in the Lancaster epidemic, which has contributed between a quarter and a third of the total for the whole country in recent weeks. Details of notifications in the counties chiefly affected are: Lancaster 1,735 (Barrow-in-Furness 242, Blackburn 71, Blackpool 70, Liverpool 68, Manchester 75, St. Helens 71, Wigan 63, Chadderton U.D. 75, Middleton M.B. 75); Yorks, West Riding, 803) (Huddersfield 176, Worsborough U.D. 72, Leeds 34, Barnsley 28, Bradford 27, Doncaster 27); Leicester 449 (Leicester 364, Wigston U.D. 47); Durham 335 (Darlington 118, Crook and Willington U.D. 27, Sedgefield R.D. 25); Glamorgan 233 (Swansea 60, Port Talbot 48, Rhondda U.D. 33, Pontypridd U.D. 30); Chester 269 (Birkenhead 19, Chester 52, Sale M.B. 32, Runcorn U.D. 29, Northwich R.D. 47); Bucks 190 (Chipping Wycombe M.B. 89, Slough 53); Gloucester 188 (Bristol 43, Gloucester 28, Cirencester U.D. 38, and R.D. 30); Surrey, 184 (Esher U.D. 62, Surbiton M.B. 65); Sussex E. 169, of which 127 were in Brighton. In the populous counties of London and Middlesex notifications were 26 and 48 respectively, and in Birmingham 20. In Scotland the rise in notifications was relatively almost as great as in England; the chief areas affected were Glasgow 333, Lanark County 52, Edinburgh 40, Greenock 27, Rutherglen Burgh (in Lanarkshire) 22. There were no cases in Aberdeen or Dundee. In Belfast notifications dropped from 153 to 118. The disease appears to be much more deadly in Northern Ireland and Scotland than in England and Wales.

Cerebrospinal Fever

The epidemic of cerebrospinal fever is now definitely on the wane, the figure for the week being just over one-half of that of the peak period, when 602 cases were notified in the week ended March 2. As in previous epidemics the fall has proved slower than the rise, which approximated to the curve for measles and influenza in abruptness, though not in magnitude. After a period of comparative freedom from the disease, as shown by the graph, it was but natural to assume that the war, or rather certain alterations in the constitution and environment of the non-immune population consequent upon the war, might be the chief if not the sole factor in the causation of the epidemic.

In the last war, however, there was no approximation to the level of the present epidemic, as the graph shows. If we take the war year 1915 as corresponding to the war year 1940, it is of interest to record the weekly notifications for the first quarters of 1915, 1916, 1917, 1918.

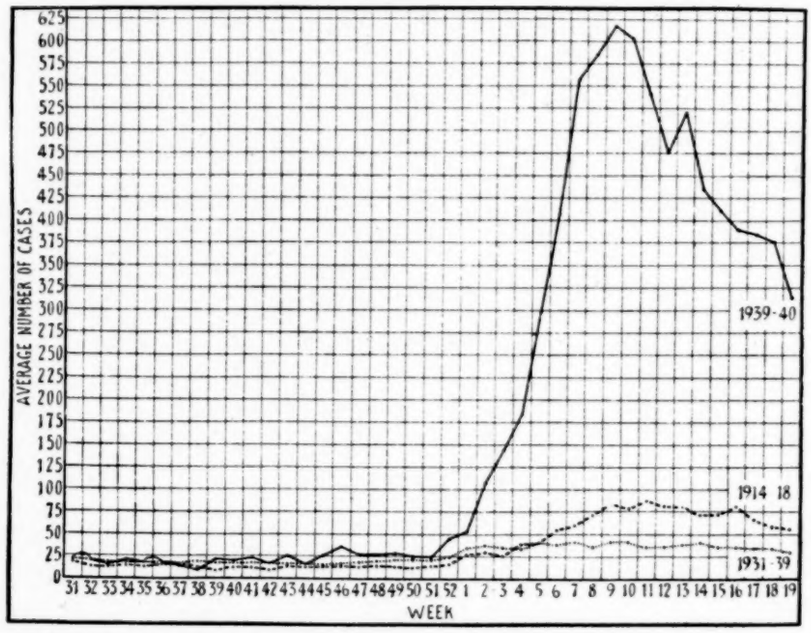


Chart showing the average number of cases of cerebrospinal fever notified in England and Wales (London included) in the autumn to spring period (31st week to 19th) in the three periods 1914–18, 1931–9, and 1939–40.

Year	Week 1	2	3	4	5	6	7	8	9	10	11	12	13
1915 ..	11	28	34	44	60	113	133	155	181	196	209	178	179
1916 ..	37	25	16	49	38	32	31	33	38	26	31	54	60
1917 ..	44	40	31	31	41	—	45	75	85	63	72	59	66
1918 ..	16	22	17	28	22	19	31	26	26	28	37	36	20

It will be seen that in 1915 the epidemic was little more than a quarter of the magnitude of the present epidemic. The 1917 figures remained high for the whole quarter. The experience of the last war encourages the hope that there will not be a repetition of the present epidemic in the next few years whether the war continues or not. It is probable that the population has been immunized to an appreciable degree by the present visitation, and if the disease reappears next spring it should be lower in incidence and severity. Particulars of age incidence and case fatality in the present epidemic are not yet available to permit a comparison with the 1915 epidemic.

No. 19

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended May 11, 1940.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1940					1939 (Corresponding Week)				
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	315	29	78	1	15	31	11	9	1	—
Deaths		1	3				2	—		
Diphtheria	657	24	257	49	37	799	98	177	34	14
Deaths	28	—	6	2	—	18	—	4	—	—
Dysentery	33	3	39		—	24	4	36		—
Deaths			2	—	—			1	—	—
Encephalitis lethargica, acute ..	8	—	2	1	—	3	—	1	—	—
Deaths		—	2				1	1		
Enteric (typhoid and paratyphoid) fever	28	1	13	5	1	20	—	3	1	
Deaths	—	—	—	—	—	1	1	—	—	—
Erysipelas			42	8	2			68	3	3
Deaths		—	—				1	1		
Infective enteritis or diarrhoea under 2 years ..										
Deaths	34	11	10	4	5	48	9	9	4	6
Measles*	6,223	26	508		121		47	193		3
Deaths	2	—	3	—	4	4	—	1	6	—
Ophthalmia neonatorum	105	11	29		—	119	10	21		—
Deaths										
Pneumonia, influenzal† ..	795	53	10	8		768	61	5	1	33
Deaths (from influenza) ..	25	1	3	—	1	45	6	3	—	2
Pneumonia, primary										
Deaths‡		33	261	8	9		9	205	9	11
				10	16				17	
Polio-encephalitis, acute	—	—				2	—			
Deaths		—					—			
Poliomyelitis, acute	6	—	1		—	5	1	—		—
Deaths		—	—				—	—		
Puerperal fever ..	2	2	12	3	—	4	4	12	2	—
Deaths		1					—			
Puerperal pyrexia ..	151	13	25		2	180	17	18		1
Deaths										
Relapsing fever ..	—	—			—	1	—			—
Deaths										
Scarlet fever ..	829	34	116	46	43	2,001	170	250	59	101
Deaths	1	1	—	—	—	2	—	—	—	—
Small-pox	—	—	—	—	—	—	—	—	—	—
Deaths	—	—	—	—	—	—	—	—	—	—
Typhus fever ..	—	—	—	—	—	—	—	—	—	—
Deaths			—	—	—			—	—	—
Whooping-cough* ..	601	13	37		10		435	303		34
Deaths	—	—	—	2	2	23	1	5	1	1
Deaths (0-1 year) ..	342	48	95	23	28	290	51	57	30	22
Infant mortality rate (per 1,000 live births) ..						45	44			
Deaths (excluding stillbirths) ..	4,614	731	703	203	179	4,550	820	614	193	148
Annual death rate (per 1,000 persons living) ..			13.0	13.6	15.7	11.2	10.5	12.4	13.0	13.0
Live births	7,172	1,109	1,008	414	277	6,765	1,148	1,016	388	268
Annual rate (per 1,000 persons living)			20.4	27.6	24.3	16.6	14.7	20.6	26.1	23.5
Stillbirths	275	38	45			261	55	44		
Rate per 1,000 total births (including stillborn)			43			38	39	42		

* Made notifiable generally on November 1, 1939.

† Includes primary form in figures for England and Wales, London (administrative county), and Northern Ireland.

‡ Since January 1, 1940, figures for London (b) have been for deaths from all forms of pneumonia; the corresponding figures for 1939 relate to deaths from lobar pneumonia only.

Medical News

The Harveian Lecture on "Hospital Administration" will be given by Dr. Arthur Morris before the Harveian Society of London at 26, Portland Place, W., on Wednesday, June 5, at 3 p.m.

The Finney-Howell Research Foundation of Baltimore has renewed the fellowship for cancer research held by Geoffrey Malcolm Badger, working in London at the Royal Cancer Hospital. Six other fellowships were renewed and six new fellowships awarded. January 1, 1941, has been fixed upon as the closing date for filing applications for awards for next year. The office of the Foundation is at 1211, Cathedral Street, Baltimore, Md., U.S.A.

A meeting of the Medical Society of Individual Psychology will be held at 11, Chandos Street, W., on Thursday, June 13, at 2.30 p.m., when Dr. J. A. Hadfield will speak on "Sexual Fetishism: Its Psychopathology and Treatment."

In view of recent developments in the course of the war, the sessional meeting of the Royal Sanitary Institute which was to have been held at Hastings on June 15 has been indefinitely postponed.

King Edward's Hospital Fund for London has opened a public relations department to supply information on nursing as a career and guidance on the choice of a training school. Inquiries should be addressed to the Nursing Recruitment Centre, 21, Cavendish Square, W.1.

Professor Henry Cohen, M.D., of Liverpool University, discussing the grave position of voluntary hospitals at the annual meeting of the Manchester Victoria Memorial Jewish Hospital, said that the fight to maintain the voluntary system was a fight for the freedom and dignity of the medical profession and for the advance of medical science. Until quite recently all medical training in this country was given at voluntary hospitals, and all advances in medicine had resulted from researches within their walls.

In addition to a sympathetic obituary notice and portrait of Colonel A. J. K. O'Brien, the April issue of the *Bulletin de l'Office International d'Hygiène Publique* contains articles on mental hygiene in the United States, family treatment of mental patients in the United States, and endemic fluorosis in Southern India.

The May issue of *La Médecine* is devoted to neurology and psychiatry under the direction of Professor Laignel-Lavastine.

The annual general meeting of the Society for Relief of Widows and Orphans of Medical Men was held on May 15, with Mr. V. Warren Low, president, in the chair. The report and financial statement for 1939 were presented and adopted. On December 31, 1939, there were sixty-two widows and four orphans in receipt of grants. During 1939 grants of £3,225 from the ordinary funds and £1,493 from the Brickwell Fund were made, and the expenses for the year amounted to £357. The total membership of the society was 289. During the year six members were elected, three died, and one resigned. The number of widows in receipt of grants in the year was such that no funds were available for the customary Christmas present. A donation of £50 was received from the Bovril Medical Agency. Membership of the society is open to a registered medical practitioner who at the time of his election is domiciled within a twenty-mile radius of Charing Cross. The election is by ballot, and is subject to the discretion of the court of directors. Relief is granted only to the necessitous widows or orphans of deceased members, who must have been members for at least three years preceding their death. Once a member is elected he may move anywhere outside the twenty-mile radius from Charing Cross. Full particulars of the society may be obtained from the secretary, 11, Chandos Street, Cavendish Square, W.1.

According to a statement in the Press, Dr. Frick, the German Minister of the Interior, has made immunization against diphtheria compulsory throughout Germany.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, W.C.1.

ORIGINAL ARTICLES and LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone, unless the contrary be stated. Correspondents who wish notice to be taken of their communications should authenticate them with their names, not necessarily for publication.

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ADVERTISEMENTS.—All communications should be addressed to the Advertisement Manager (office hours, 9 a.m. to 5 p.m.). Orders for copies of the *Journal* and communications with reference to subscriptions should be addressed to the Secretary, B.M.A. House.

The TELEPHONE NUMBER of the British Medical Association and the *British Medical Journal* is EUSTON 2111.

The TELEGRAPHIC ADDRESSES are

EDITOR OF THE *BRITISH MEDICAL JOURNAL*, *Aitiology Westcent, London.*

SECRETARY, *Medisecra Westcent, London.*

The address of the B.M.A. Scottish Office is 7, Drumsheugh Gardens, Edinburgh (telegrams: *Associate, Edinburgh;* telephone 24361 Edinburgh), and of the Office of the Cumann Doctúirí na h-Éireann (I.M.A. and B.M.A.), 95, Merrion Square, W., Dublin (telephone 62550 Dublin).

QUERIES AND ANSWERS

Burning Sensation in Hand

Dr. G. LL. DAVIES (Hove) writes: I should be very glad to know if any reader of the *B.M.J.* can suggest a remedy for a female patient 60–70 years of age who suffers from an intense burning sensation on the ulnar margins of the palms of the hands. This is worse in warm weather. Various cooling applications have been tried, but without much effect. This is presumably a trophic disturbance of some sort. She also suffers from Ménière's syndrome.

Reading without Arms

Mr. J. H. BADCOCK, F.R.C.S., L.D.S., writes from Jamaica: The problem recently set by "X Y Z" appeared in your columns some years ago, but so far as I know found no solution. The future invention of such a machine does not seem impossible: meanwhile I offer the following suggestions. In each case the rigid fixation of the book on a rigidly fixed bed-table is a first necessity. The practicability of either would depend upon the degree of movement of the head and trunk of which the patient was capable. In the recumbent position all would be impossible. The patient might turn the leaves with his nose suitably moistened with something slightly sticky on a sponge within his reach. Or he might hold an artificial "finger" between his teeth. It would need to be grasped very firmly, and for the purpose any dentist could make a vulcanite plate into which the teeth would fit and so give a firm grip. The end of the "finger" should be of rubber and slightly flexible. A rubber thimble such as stationers sell for turning over leaves, or the pimply kind used for gum massage, might serve. A clip should be attached to the bookstand to hold the "finger" when not in use. Rubber "bones" for dogs to play with are sold by dog fanciers and rubber shops, and it is just possible that one of these pared down at each end, one being left wide for the teeth to grip, might serve the purpose. It might be worth trying with or without a sponge to moisten it. Where teeth are not available the "finger" might be attached to the bridge of something like a spectacle frame provided with flanges to bear against the sides of the nose and the margins of the orbits to give rigidity, and fastened round the head. The leaves to be turned could be fixed, if need be, with a very light rubber band, and those already turned by half an inch or so of rubber flexible enough to give way for the reception of the leaf and rigid enough to retain it. A small piece of the inner tube of a motor tyre tacked to the ledge supporting the book might do. Sections of such a tyre might be used to fasten the covers of the book firmly to the rest.

Cramp in Legs

"T. F. M. S." writes: The late Dr. Andrew Smart had a simple but effective remedy—a teaspoonful of bicarbonate of soda in half a tumbler of hot water last thing at night.

LETTERS, NOTES, ETC.

Artificial Respiration: The Schäfer Method

Just before the outbreak of war the Royal Life Saving Society issued 100,000 copies of the illustrated leaflet on the Schäfer method of artificial respiration, giving instructions taken from the manuscript written for the society by Sir Edward Sharpey-Schäfer in 1931. The society has also published a booklet entitled "Artificial Respiration: Are You Prepared?" Copies of the leaflet will be forwarded to any medical man who sends a penny stamp for postage, with his name and address, to the chief secretary, Royal Life Saving Society, at its temporary office, 11, Thetford Road, New Malden, Surrey. Copies of the booklet are also obtainable (price 6d., plus 1d. for postage).

Chicken-pox in the Newborn

Dr. J. COUTTS MILNE (Kuala Lumpur, Malaya) writes: The note in the *Journal* of March 30 (p. 519) referring to H. H. Schuman's remarks on the rarity of chicken-pox in the newborn prompts me to put on record the occurrence of a case in Kuala Lumpur, Federated Malay States. The mother—a Eurasian lady—was admitted to hospital for delivery while suffering from an attack of chicken-pox. Two days after birth the child developed a rash with about a dozen vesicles. The attack was mild and without complications.

Red Cross in China

The war in China has been almost forgotten in our European preoccupations, but a reminder of it appears as an illustrated abstract of the fourth report of the Chinese Red Cross Medical Relief Corps. It is entitled "Wounded Soldier in China," is issued from Bishop's House, Hong Kong, and tells the story, mainly, of 1939. As the war continues tactics and territories alter. One result is that fewer wounded and more sick are brought to the Red Cross hospitals. Another modification of Red Cross effort has been imposed by the fact that the Chinese have adopted the strategy of completely obliterating roads and highways to embarrass the enemy. The Red Cross has met the situation by subdividing its emergency hospitals, receiving stations, and field hospitals into smaller and more mobile units. The main conditions which required surgical attention in 1939 were chronic infections and disabilities. With the accumulation of deformities more emphasis is being laid on reconstructional surgery, and an orthopaedic centre has been established as a nucleus from which it is hoped other centres will develop. During 1939 one and a quarter million dressings were applied, 3,698 fractures reduced, and 10,572 other operations performed. A five-point anti-epidemic programme has been laid down, aiming at the control of various infectious and nutritional deficiency diseases by preventive units. The number of persons serving in the Medical Relief Corps increased last year to 1,847.

A Plea for Cheaper Medical Books

"MEDICAL PUBLISHER" writes: In reply to the plea of "F. L." for paper-bound medical books (May 18, p. 838), I would like to point out that the cost of folding, collating, and stitching is included in the cost of binding. These operations would still have to be paid for, and in addition the printing on the paper cover. Furthermore the cost to the individual of having selected volumes bound would work out at a much higher rate per volume than the amount saved. For example, the estimated saving on a half-guinea book would be about sixpence, whereas to have a copy of the same work bound in cloth would cost the individual purchaser about five shillings. On higher-priced and larger works the saving would be proportionately less, and the cost of rebinding proportionately higher. The subject of this letter might almost be regarded as a "hardy annual." It, and other questions to the same end, are constantly in our minds.

Ciba Limited (Horsham, Sussex) have issued a second edition of their booklet entitled "The Sex Hormones," which is described as a survey of their chemical constitution, biological properties, and clinical applications, with a classified scheme of dosage. It can be obtained on application to the above firm.